MYDAUS
Maine Youth Drug and Alcohol Use Survey
State of Maine Report
1998-99

Prevalence of Alcohol, Tobacco, and Other Drugs, Prohibited Behaviors, and Risk and Protective Factors Among Students in the State of Maine

Prepared for

State of Maine
Office of Substance Abuse (OSA)
Department of Mental Health, Mental Retardation, and Substance Abuse Services

Prepared by

Research Triangle Institute

Jody M. Greene
Tracy U. Baird
JoAnn Kuo

Submitted Under

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The development and implementation of the 1998/1999 Maine Student Survey was truly a collaborative effort. In addition to the Maine Office of Substance Abuse (OSA) in the Department of Mental Health, Mental Retardation and Substance Abuse Services (DMHMRSAS), which oversaw the entire project, the following agencies were involved in the completion of this study:

Pan Atlantic Consultants (PAC), 5 Milk Street, Portland, Maine 04101, responsible for all survey administration activities and providing schools and school systems with individual reports;

Southeast Kansas Education Service Center (SKESC), P.O. Box 189, Girard, Kansas 66743-0189, responsible for data scanning;

the Social Development Research Group (SDRG), University of Washington, 9725 3rd Avenue NE, Suite 401, Seattle, Washington 98115-2024, developed the survey instrument and syntax relating to survey validity testing; and

the Research Triangle Institute (RTI), P.O. Box 12194, Research Triangle Park, North Carolina 27709, responsible for weighting the data, data analysis, and report production.

Jamie Clough served as the Project Director, Kristina Morse (PAC) served as the data collection task leader, LaDonna Hartman (SKESC) served as the scanning task leader, and Jody Greene (RTI) served as analysis and reporting task leader. Others whose efforts on this project should be noted include Linda Williams (OSA), Kristin Furey (PAC), Katie Korpi (PAC), Melanie McCoy (PAC), Tom Sternberg (RTI), Paul Moore (RTI), Richard Straw (RTI), Linda Fonville (RTI), and Sharon Davis (RTI).

Everyone involved in this project would like to extend their thanks to the principals and superintendents who chose to participate in this survey, and to the teachers and school staff who supported this effort. But, most importantly, we would like to thank the students who took the time and effort to share their experiences with us. This report is our way of thanking all of you. We hope that you find the report informative and useful.

For further information about this project, contact:

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www.state.me.us/dmhmrsa/osa

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EXECUTIVE SUMMARY

The Maine Youth Drug and Alcohol Use Survey has been administered periodically by the Office of Substance Abuse (OSA) since 1988. The survey administered in 1998/1999 served as the basis for the research reported in this report. The survey was administered to over 22,000 Maine students, representing all 16 counties, enrolled in grades 6 through 12.

For the first time in the history of the Maine Youth Drug and Alcohol Use Survey, the OSA elected not to draw a randomized sample of schools to take part in the 1998/1999 survey. Rather, in order to increase usable data, the OSA decided to solicit *all* public schools in Maine with grades 6 through 12. We estimate that approximately 18% of Maine's student population in grades 6 to 12 participated in the 1998/1999 survey. It is anticipated that the results from this survey will be useful for school planning and will result in greater participation in subsequent administrations of the survey.

This report presents findings designed to provide data on the prevalence of alcohol, tobacco, and other drug use among Maine students in grades 6 through 12 and to identify potentially "modifiable" risk and protective factors that may be useful to consider in planning and targeting prevention programs and services. This report presents the statewide results from this survey.[1]

Key findings from the 1998/1999 Maine school survey analyses are as follows.

Prevalence of Alcohol, Tobacco, and Other Drugs

- Among students in grades 6 through 12, alcohol, cigarettes, and marijuana were the most commonly used substances. The majority (58%) used at least some alcohol in their lifetime, and 32% used it in the month before the survey. In addition, approximately 15% exhibited binge drinking behavior in the 2 weeks before the survey. Recent cigarette use was reported by 19% of students and recent marijuana use by 16%.

- After marijuana, the most frequently used substance was inhalants. Approximately 15% of students reported using inhalants during their lifetime.

- There were few differences in substance use by gender or race/ethnicity.

[1] Separate reports have been generated for each county and are available upon request from the OSA.

- The rate of substance use increased steadily among students between grades 6 and 12 for all substances except inhalant use, where the highest rates of recent use were reported among 6th through 9th graders.

- Overall, students in Maine reported substance use prevalence rates that were similar to those reported in the Nation.[2] The one notable exception was that both lifetime use and past month use of marijuana were substantially higher among Maine 12th graders (58% and 30% respectively) than among 12th graders in the Nation as a whole (49% and 23%, respectively).

Prevalence of Violent and Prohibited Behaviors

- Twelve percent of Maine's students reported attacking others during the year prior to the survey with the intention of seriously hurting them. About twice as many males as females reported this behavior. Attacking someone peaked in grades 8 and 9.

- About 4% of Maine students had carried a handgun in the year prior to the study. Again, males were much more likely to report this behavior than females (6% for males vs. 1% for females).

- Almost 9 in 10 Maine students (87%) reported that they neither attacked someone nor carried a handgun in the year prior to the survey. An estimated 7% reported performing one or the other behavior "1 or 2 times," and the remaining 6% reported these behaviors more frequently.

- Past year prohibited behaviors included on the survey were being drunk or high at school, being suspended from school, stealing or trying to steal a motor vehicle, selling illegal drugs, and having been arrested. Of these, the most common was being drunk or high at school (13%), followed by having been suspended from school (9%) and selling illegal drugs (7%). Reports of being arrested (4.5%) and stealing or trying to steal a motor vehicle (2.4%) were lower.

- About 2 in 10 Maine 11th and 12th grade students reported being drunk or high at school in the year prior to the survey.

- Among 10th through 12th graders, more than 1 in 10 reported having sold illegal drugs in the year prior to the survey.

[2]National comparison data were from the 1998 Monitoring the Future Survey.

Risk and Protective Factors

- In general, as students became older, they were at increasing risk on the various risk factors and less resilient on the protective factors. For example, only 7% of 6th graders were at risk on the factor of "perceived availability of drugs and handguns" compared with 33% of 8th graders, 66% of 10th graders, and 80% of 12th graders.

- Nearly half of all students in Maine were at risk on the factor of "perceived availability of drugs and handguns," and over one quarter were at risk on the factors of "poor family discipline," "family conflict," and "family history of antisocial behavior."

- Less than half of all students in Maine were resilient on the protective factors of "community opportunities for positive interaction" and "community rewards for conventional involvement."

- All risk factors within each domain (i.e., community, school, family, and peer-individual) were shown to be positively related to health behaviors. Some of the strongest relationships between health behaviors were for the peer-individual risk factors of "early initiation of substance use," "attitudes favorable toward drug use," "friends' substance use," and "antisocial behaviors." Youths who were at risk on each of these factors were 10 to 17 times more likely to have used alcohol or drugs in the past month than students who were not at risk on these factors. The risk factors that showed the strongest relationships with violent and prohibited behaviors in the past year were "early initiation of antisocial behaviors" and "interaction with antisocial peers."

- Protective factors from all domains were shown to be positively related to the health behavior scales. Youths who were resilient on these factors were 2 to 10 times more likely *not* to report substance use or violent or prohibited behaviors than students who were not resilient.

- The cumulative effect of risk and protection on alcohol and drug use was evident among Maine students. Students at high risk on a larger number of risk factors were increasingly more likely to use alcohol and other drugs, while students possessing a larger number of protective factor were increasingly less likely to use alcohol and other drugs.

Strengths and Limitations

This study provides valuable information on alcohol, tobacco, and other drug use, violent and prohibited behaviors, and risk and protective factors that will enable the State to

- *monitor* trends in the substance (i.e., alcohol, tobacco, and other drug) use of Maine students,
- *compare* students in each county with students in the State as a whole, and
- *plan, evaluate, and improve* community programs that prevent health problems and promote healthy behaviors..

However, several limitations of this study should be noted. First, this study exclusively focuses on adolescents in public school and does not take into consideration school dropouts, students absent on the day that data were collected, homeless and runaway youths, and youths who have been institutionalized. Second, the questionnaire implemented in this study measures self-reported behavior. Caution should be taken in interpreting these data because of respondents' tendencies to underreport undesirable behaviors and to have difficulty remembering complicated information, such as age at first use. Third, active parental consent was required in order for students to participate. Active parental consent may affect results if the parents of certain types of students were more or less likely to turn in the form and grant permission for their child to participate. Finally, the change in sampling design in 1998/1999 compared to previous administrations has several effects that have both positive and negative implications. Limitations of using a census rather than a representative sample are that (a) the data collected are *not* representative of schools in the State as a whole, but rather only of the schools who completed the survey; and (b) the ability to compare the 1998/1999 data with data collected in previous years is limited.

Implications and Recommendations

These findings suggest that all four domains (community, school, family, and peers) must be addressed together to have an impact on the issue of alcohol, tobacco, and other drug use. A comprehensive systemic approach to this issue using science-based programming and multiple strategies in multiple domains has been proven to be the most effective method of prevention. Concentrating efforts on only school-based programs or only targeting certain age groups will only yield minimal success. The data do suggest that transitional years for youths seem to be a time when alcohol, tobacco, and other drug use increases and strategies need to address this issue. Data also suggest that prevention programs target the issue of access to alcohol, tobacco, and other drugs in that use seems to increase as access increases. Therefore, the concept of environmental strategies should be addressed in order to decrease access, increase consequences, or change perceptions regarding alcohol, tobacco, and other drug use.

1. INTRODUCTION

The 1998/1999 Maine Youth Drug and Alcohol Use Survey measures the prevalence of alcohol, tobacco, and other drug use, as well as risk factors for such use. The survey is part of a larger effort to help communities promote the "resiliency" of young people by reducing high-risk behaviors and increasing healthy behaviors. The survey provides the State with accurate information about Maine students that will enable the State to

> *monitor* trends in the substance (i.e., alcohol, tobacco, and other drug) use of Maine students,
>
> *compare* students in each county with students in the State as a whole, and
>
> *plan, evaluate, and improve* community programs that prevent health problems and promote healthy behaviors.

The Maine Youth Drug and Alcohol Use Survey has been administered periodically by the Office of Substance Abuse (OSA) since 1988. The survey administered in 1998/1999 served as the basis for the research reported here. The 1998/1999 survey was administered to over 22,000 Maine students, representing all 16 counties, enrolled in grades 6 through 12.

This report presents the statewide results from this survey. [1] To present the data and information from this study in a meaningful manner, this report is divided into five chapters. The remaining sections of this chapter provide information on the purpose and rationale for this study, background literature, the study methodology (including a discussion of the questionnaire, sampling, data collection, and data processing and weighting), procedures for analysis, and limitations of the data. Chapter 2 provides prevalence estimates of Maine students' use of tobacco, alcohol, and other drugs. Chapter 3 provides prevalence estimates of violent and prohibited behavior among Maine students. Chapter 4 provides findings about community, school, family, and peer-individual risk factors associated with students' alcohol and drug use, as well as violent and prohibited behaviors. Chapter 5 summarizes the key study findings and the implications of these findings for prevention planning and resource allocation, policy, and services. In addition, the report has three appendices providing supplementary tables (Appendix A), the suppression rule for prevalence estimates (Appendix B), and the instrument used to collect the data (Appendix C).

[1] Separate reports have been generated for each county and are available upon request from the OSA.

1.1 Purpose and Rationale

Substance abuse has been called the Nation's number one health problem. Numerous studies have documented the negative consequences associated with substance abuse among adolescents, including the following:

> *suicidal behavior* (Burge, Felts, Chenier, & Parrillo, 1995; Crumley, 1990; DuRant, Smith, Kreiter, & Krowchuk, 1999b; Garrison, McKeown, Valois, & Vincent, 1993; Harrison & Luxenberg, 1995; Lester, 1999; Windle & Windle, 1997; Woods et al., 1997),
>
> *delinquency and violence* (Donovan & Jessor, 1985; Dukarm, Byrd, Auinger, & Weitzman, 1996; DuRant et al., 1999b; Ellickson, Saner, & McGuigan, 1997; Grunbaum, Basen-Engquist, & Pandey, 1998; Osgood, Johnston, O' Malley, & Bachman, 1988), and
>
> *high-risk sexual behaviors* (Donovan, Jessor, & Costa, 1988; Duncan, Strycker, & Duncan, 1999; Fortenberry, 1997; Hundleby, 1987; Ketterlinus, Henderson, & Lamb, 1990; Orr, Beiter, & Ingersoll, 1991; Valois, Oeltmann, Waller, & Hussey, 1999).

Clearly, substance use can create both acute and long-term problems for students and their families.

Given the high prevalence and devastating impact of substance abuse, drug and alcohol use and abuse are high priorities for the Federal, State, and local governments. At the Federal level, the focus is shifting, with increased emphasis being placed on efforts targeted at adolescents. The number one priority in the 1999 national drug control strategy is to "educate and enable America's youth to reject illegal drugs as well as alcohol and tobacco" (Office of National Drug Control Policy [ONDCP], 1999).

At the State and local level, developing and targeting effective prevention and intervention strategies and evaluating their impact require solid information on the extent of alcohol and drug use among adolescents. The Maine Youth Drug and Alcohol Use Survey was instituted by the State of Maine to obtain such information about the nature, severity, and range of substance use and abuse among adolescents and to better plan its primary and secondary prevention efforts.

The overall goal of the survey series is to estimate the number and characteristics of middle and high school students in Maine who are at elevated risk of alcohol, tobacco, and other drug use and related problems, or who are already substance users. Because a fundamental premise of prevention

science is that in order to prevent the future occurrence of a behavior, risk factors for that behavior must be decreased and/or protective factors must be enhanced. Therefore, this survey series was also designed to identify risk and protective factors for substance use among the Maine school-aged population. This report on the results from the most recently administered survey in the series will begin the process of distinguishing various population subgroups with respect to their risk and protective factor profiles.

1.2 Background Literature

1.2.1 Epidemiology of Alcohol, Tobacco, and Other Drug Use in Adolescence

The epidemiology and developmental course of alcohol, tobacco, and other drug use among youths have been well documented empirically from epidemiological surveys, such as the Monitoring the Future (MTF) project (Johnston, O' Malley, & Bachman, 1999) and from multiple longitudinal studies (e.g., Jessor & Jessor, 1977; Kandel, Kessler, & Marguilies, 1978; Newcomb & Bentler, 1988). These data reveal relatively consistent age-specific developmental patterns of experimentation and regular use, particularly associated with alcohol and cigarettes, with the prevalence of consumption increasing with age. For example, according to the 1999 MTF project, approximately one quarter of 8th graders, approximately 40% of 10th graders, and one half of high school seniors reported use of alcohol in the past month (Johnston et al., 1999). Approximately 17% of 8th graders, 26% of 10th graders, and 35% of high school seniors reported cigarette smoking in the past month. In addition, the sequencing of use of multiple substances has been well documented. Adolescents tend to initiate substance use in particular stages with beer or wine generally used first, followed by hard liquor and/or smoking, then marijuana use, followed last by use of other drugs (Ellickson, Hays, & Bell, 1992; Kandel, Yamaguchi, & Chen, 1992).

Findings on the epidemiology and developmental sequencing of alcohol, tobacco, and other drug use among adolescents have prompted focus on adolescence as an optimal time to target prevention and intervention programs. It is during this period, when youngsters are not yet commonly using alcohol, tobacco, and other drugs, that the potential to alter the typical course of development and to influence future outcomes has been thought to be greatest. Estimation of the size of the population potentially in need of prevention programming is indicated by data measuring age-specific patterns of alcohol, tobacco, and other drug use. Typical indicators of use are the prevalence of substance use (e.g., lifetime and current use of tobacco, alcohol, marijuana, and cocaine), levels of use (e.g., quantities of cigarette and alcohol use), and age of onset of various substances.

1.2.2 Risk and Protective Factors for Alcohol, Tobacco, and Other Drug Use in Adolescence

Risk factors, especially in the absence of protective factors, can predicate subsequent substance use and thus are particularly relevant to prevention programming. Identification of specific populations in which risk factors are high and protective factors are low allows identification of prevention needs and facilitates targeting programming toward the reduction of risk factors and the enhancement of protective factors (Hawkins, Arthur, & Catalano, 1997).

Social research has identified numerous and interrelated factors that increase or decrease the probability of alcohol, tobacco, and other drug use and related problems among youths. These risk and protective factors are found at multiple levels, including the individual, the family, the peer group, the school, and the community (Hawkins, Catalano, & Miller, 1992; Kandel, Simcha-Fagan, & Davies, 1986; Newcomb & Felix-Ortiz, 1992). Activities and programs intended to prevent adolescent use of alcohol, tobacco, and other drugs typically have been implemented in schools, have targeted risk factors, and have been aimed at single levels (e.g., individual-level factors). There is increasing recognition, however, of the need for and potential effectiveness of broad-based efforts focused on multiple levels, as well as on both risk and protective factors (Hawkins et al., 1992, 1997; Linney & Wandersman, 1991; McLeroy, Bibeau, Steckler, & Glanz, 1988). The rationale underlying the broad-based approach is that no single factor has been identified that largely accounts for drug use; instead, the complex interaction of risk and protective factors requires a multipronged approach.

Etiological research on adolescent use of alcohol, tobacco, and other drugs, as well as related problems, over the past three decades has focused almost exclusively on identifying risk factors that promote use. A wide array of risk factors has been identified both within the individual and within the social context in which individuals live. Hawkins et al. (1992, 1997) cataloged key risk factors identified in the literature, including individual and interpersonal factors and contextual factors. Individual and interpersonal risk factors included physiological factors (i.e., biochemical and genetic factors), family drug use, family management practices, family conflict, low bonding to family, early and persistent problem behaviors, academic failure, low commitment to school, peer rejection in early grades, association with drug-using peers, alienation and rebelliousness, attitudes favorable to drug use, and early onset of drug use. Contextual factors included community laws and norms favorable to drug use, availability, economic deprivation, and neighborhood disorganization. Similar inventories of risk factors have been identified in multicausal studies of adolescent use of alcohol, tobacco, and other drugs (e.g., Bailey, Flewelling, & Rachal, 1992a; Castro, Maddahian, Newcomb, & Bentler, 1987; Kandel et al., 1986; McAlister, Krosnick, & Milburn, 1984; Newcomb & Felix-Ortiz, 1992). The findings indicate that the greater the number of risk factors present, the greater the risk of drug abuse.

Considerably less research attention has been devoted to factors that protect adolescents from involvement with alcohol, tobacco, and other drugs, although there is increasing recognition of the potential importance and relevance to prevention policy and programming of protective factors (Hawkins et al., 1992, 1997; Newcomb & Felix-Ortiz, 1992). Protective factors are believed to work by moderating or completely blocking the effect of factors that increase the risk for drug involvement. Among the protective factors for which there is some empirical support are individual resilience, strong family relationships, a supportive family environment, problem-solving skills, and self-efficacy beliefs (Hawkins et al., 1992, 1997; Kandel et al., 1986; Newcomb & Felix-Ortiz, 1992). Hawkins et al. (1992) suggested that such factors are consistent with a social development model that emphasizes the role of bonding to prosocial family, school, and peers as a protection against drug abuse. In particular, these authors identified four elements of social bonding that are inversely related to drug abuse: strong attachments to parents, commitment to schooling, regular involvement in church activities, and belief in the generalized expectations, norms, and values of society. Protective factors are believed to function in a similar manner to risk factors. That is, protective factors exist across multiple domains. The more numerous the factors, the greater the protective effect.

1.3 Methodology

1.3.1 Questionnaire

The 1998/1999 Maine Youth Drug and Alcohol Use Survey was adapted from the Student Survey of Risk and Protective Factors and Prevalence of Alcohol, Tobacco, and Other Drug Use, which was developed by the Social Development Research Group (SDRG) at the University of Washington (Hawkins et al., 1997). The SDRG questionnaire was originally developed for use in the Six-State consortium (of which Maine was a member) for substance abuse prevention needs assessment studies sponsored by the Center for Substance Abuse Prevention (CSAP). As part of that effort (called the Diffusion Project), a new grant with seven participating States is administering the same survey over a 5-year period. This survey is scheduled to be readministered in 2000 and 2002. The instrument was printed on an electronically scannable form prepared by Scantron, Inc., of Tustin, California. A copy of the instrument is included in Appendix C.

1.3.2 Sample Design

For the first time in the history of the Maine Youth Drug and Alcohol Use Survey, the OSA elected not to draw a randomized sample of schools to take part in the survey. Rather, to increase usable data, the OSA decided in 1998 to solicit *all* public schools in Maine with grades 6

through 12. In the end, only those schools that volunteered to take part in the survey were included in the sample.

The change in sample design has both positive and negative implications. On the positive side, these data provide an indication of drug use and risk and protective levels for counties that would not otherwise have been available. Survey results at the county level can play a vital role in regional and local needs assessment and planning processes. It is anticipated that participation in the survey will increase in subsequent administrations of the survey.

Limitations of using a census rather than a representative sample are that

> the data collected are *not* representative of schools in the State as a whole, but rather only of the schools who completed the survey; and
>
> the ability to compare the 1998/1999 data with data collected in previous years is limited.

School Recruitment Procedures. To engender school participation, in the fall of 1998, the OSA sent a recruitment letter to all school superintendents in Maine asking them to participate in the Maine Youth Drug and Alcohol Use Survey. The letter introduced the project, conveyed its purpose and importance, and encouraged participation. It also contained a very brief description of the survey and its content. The letter was signed by three State Commissioners–Departments of Education, Human Services, and Mental Health, Mental Retardation, and Substance Abuse Services. A letter of intent fax-back form was enclosed with the recruitment letter. Superintendents who wanted the school(s) in their district to participate in the survey completed the form and faxed it back to the OSA. On the form, superintendents indicated contact information, schools in their system that serve grades 6 through 12, and expected enrollment. The OSA then sent this information to the State' s data collection contractor, Pan Atlantic Consultants (PAC) in Portland, Maine. The staff at PAC then contacted each individual school by phone to coordinate their participation in the survey.

Altogether, it was possible to collect data from 212 of the 460 schools with grades 6 through 12 in Maine; this resulted in a school response rate of 46.1% (Exhibit 1.1). School response rates varied across counties, ranging from a high of 78% in Piscataquis County and Washington County to a low of 16% in Lincoln County.

Exhibit 1.1 School, Student, and Overall Response Rates for the Maine School Survey: 1998/1999

State Location	Number of Schools[1]	Number of Schools That Participated	School Response Rate	Number of Students in Participating Schools	Number of Usable Questionnaires	Student Response Rate	Overall Response Rate
Total Maine	**460**	**212**	**46.1%**	**54,908**	**22,162**	**40.4%**	**18.6%**
County[2]							
Androscoggin	33	22	66.7%	6,877	2,163	31.5%	21.0%
Aroostook	43	18	41.9%	2,827	1,366	48.3%	20.2%
Cumberland	49	21	42.9%	12,193	4,423	36.3%	15.6%
Franklin	14	6	42.9%	1,934	926	47.9%	20.5%
Hancock	36	14	38.9%	1,739	592	34.0%	13.2%
Kennebec	34	6	17.6%	2,834	1,495	52.8%	9.3%
Knox	17	8	47.1%	2,525	1,640	65.0%	30.6%
Lincoln	19	3	15.8%	803	400	49.8%	7.9%
Oxford	23	7	30.4%	2,117	643	30.4%	9.2%
Penobscot	47	17	36.2%	3,726	2,184	58.6%	21.2%
Piscataquis	9	7	77.8%	1,706	676	39.6%	30.8%
Sagadahoc	14	10	71.4%	2,297	735	32.0%	22.8%
Somerset	28	6	21.4%	825	248	30.1%	6.4%
Waldo	16	12	75.0%	2,599	703	27.0%	20.3%
Washington	37	29	78.4%	2,250	851	37.8%	29.6%
York	41	26	63.4%	7,656	3,103	40.5%	25.7%

[1]Maine Department of Education provided school count information for 1998.
[2]County information was missing for 14 respondents.

Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

Student Consent Procedures. *Active consent* methodology, which requires parental consent for participation in the survey, was used. To obtain active consent, participating schools were required to send an informational letter and permission slips to parents. The letter conveyed the purpose and importance of the survey and encouraged participation. It also explained that the survey was anonymous, participation was voluntary, and results would be only presented in group-summary form. Only students who returned slips granting permission to participate in the survey were asked to complete the survey.

Within School Sampling. The OSA' s stated objective was to obtain enough surveys from each school so that each individual school' s data would have a margin of error no greater than ±5.00% at the 95% confidence level. However, a significant amount of fallout was anticipated due to issues of active consent, absenteeism, and other unforeseeable factors. The estimated degree of attrition due to the requirement of active consent was expected to be in the 50% range.

The total student population was targeted in schools with enrollment figures of 250 or fewer. Schools with more than 250 students were sampled through a target population that would provide data not to exceed a ±5.00% margin of error at the 95% confidence interval. As the estimated degree of attrition was in the 50% range due to active consent, PAC targeted twice the number of students needed for a ±5.00% margin of error when a sample was selected. In such schools, students were randomly selected according to classes in a required subject area, such as English, or the period 2 class. Students who did not provide written parental consent to participate and/or who did not themselves wish to participate were asked to sit quietly at their desks with an alternative activity during survey administration. Additional surveys were left behind for students absent on the day of data collection. Completed absentee surveys were sent back to PAC in postage-paid envelopes.

It is important to note that PAC could not guarantee a margin of error of ±5.00% for each school. PAC staff followed the methodology outlined above for all schools but had no control over the number of surveys that were completed for each school due to the active consent factor.

1.3.3 Data Collection

Data collection began in October 1998 and continued through March 1999. The majority of surveys were administered by PAC staff. However, in schools that decided on dates that PAC staff were unable to administer the survey, as well as in the 10 selected community schools, it was necessary to train school staff to administer the survey themselves. For those schools, PAC trained school staff who would be administering the survey or trained the primary school contact, who then conducted a training session for all school staff involved in the survey administration. The training sessions covered survey protocol determined by the University of Washington' s SDRG Diffusion

Project. The training sessions included the following: a discussion regarding anonymity and confidentiality; the process of survey administration; dissemination of the survey instructions to be read to students, as well as guidelines for student question clarification; and instructions on how survey administrators should fill out the survey summary forms. Most training sessions took approximately 1 hour to complete.

Considerable precautions were taken to protect the anonymity of individual students in order to increase the likelihood of valid responses. First, the surveys were administered by trained PAC survey administrators rather than school staff. Second, each classroom teacher was asked to remain seated during the survey administration to lend further credence to assurances of anonymity. Third, student consent was also required; that is, youths were asked to participate in the survey, informed of the confidentiality of their responses, and informed that their response was voluntary (i.e., they could refuse to answer any questions that they did not want to answer). Finally, students were asked to insert their completed questionnaires in a large envelope as it was passed around the room at the end of the survey period. The last student sealed the envelope and placed it on an empty desk at the front of the room. At the end of each interview period, the envelope was immediately sealed by a PAC survey administrator without anyone from the school seeing the completed questionnaires.

1.3.4 Data Processing and Weighting

Data Processing. Completed questionnaires were batched by PAC and sent to the Southeast Kansas Education Service Center (SKESC) in Girard, Kansas, for scanning. The data files were then returned to PAC for editing. PAC ran consistency checks on the data to exclude careless, invalid, or logically inconsistent responses using syntax originally developed by the Social Development Research Group (SDRG). Surveys were excluded from the final analytic file if they met any of the following criteria:

> Students were asked to indicate their honesty level in completing the survey. Students who reported that they were not at all honest were deleted from the analytic file.
>
> Students were asked about their use of a fake drug to help determine if students were answering affirmatively without carefully reading the questions. Students who answered that they had used the fake drug "derbisol" in both the lifetime and the past month were deleted from the analytic file.
>
> Students who identified using alcohol and/or drugs an improbable number of times in the past 30 days also were excluded from the analytic file.

Altogether, 22,162 students of the 54,908 (or 40.4%) students in the participating schools returned usable questionnaires (Exhibit 1.1). The percentage of participating students varied across counties, ranging from a high of 65% in Knox County to a low of 27% in Waldo County.

The overall response rate for the 1998/1999 Maine Youth Drug and Alcohol Use Survey, taking into consideration both the school and student response rates, was 18.6% (school response rate * student response rate; 46.1 * 40.4 = 18.6). Exhibit 1.1 also displays overall response rates by county, which ranged from a low of 6% in Somerset County to a high of 31% in Knox County and Piscataquis County.

A copy of the edited data file was returned to the OSA, which then made a copy of the file available to the data analysis and reporting subcontractor, Research Triangle Institute (RTI), for analysis.

Weighting. All public schools were offered the chance to participate in the survey. Due to school and student nonresponse, a total of 22,162 students in grades 6 through 12 were surveyed (approximately 18.6% of the total enrollment). Because the 1998/1999 survey was not a random sample, it was not possible to weight the data to be representative. However, because the overall survey response varied considerably across the grades, across the 16 counties, and for males and females, a set of post-stratified survey weights were computed for use in data analysis. These adjusted weights were used to correct the data, to the extent possible, for the response differentials observed.

Fall enrollment data with student counts by county, gender, and grade were compared with the number of students tested in the same classification. The data file contained county, gender, and grade information for 21,695 students, or 97.9% of those tested. For these 21,695 students, the adjusted survey weights were calculated as the total student enrollment for each cell of the grade/gender/county cross-classification, divided by the number of students tested in that cell. There were 17 of the 224 cells in which testing was completed for fewer than 20 students. These cells were combined with adjacent cells for the same gender and county for the purpose of the weight calculations, so that each weight was calculated based on at least 20 students tested.

There were 467 students tested for whom one or more of the variables for gender, county, and grade were missing. An average weight over all students tested was calculated for them.

1.3.5 Survey Demographic Characteristics

Exhibit 1.2 presents selected demographic characteristics of the 1998/1999 survey respondents. Because of the relatively small numbers of African Americans, Hispanics, Asian or Pacific Islanders, American Indians, and youths in other racial/ethnic groups, these racial/ethnic categories were collapsed into one category in the remaining tables in this report. Comparisons of the demographic characteristics of youths participating in the survey with demographic characteristics of youths in the State as a whole (using State enrollment information) indicates close correspondence.

1.4 Data Analysis

This study focuses on several key areas designed to provide a comprehensive picture of prevention need among Maine's student population at the time the survey was conducted. A complete profile of the characteristics of adolescents in need of substance abuse prevention will allow the State to plan and target services more effectively.

1.4.1 Research Questions

We pursued several research questions in this study:

What is the prevalence of alcohol, tobacco, and other drug use among Maine's student population?

What is the prevalence of violent and prohibited behaviors among Maine's student population?

What risk and protective factors are associated with alcohol and drug use, as well as violent and prohibited behaviors among Maine's students?

Our analytic approach to answering these research questions was primarily descriptive and involved the computation and presentation of prevalence estimates (i.e., percentages and estimated numbers). Definitions and measures of substance use, violent and prohibited behaviors, and risk and protective factors are explained in the text where they are encountered.

We produced separate prevalence estimates for use of the following substances:

alcohol (including binge use),

marijuana,

inhalants,

Exhibit 1.2 Demographic Characteristics of the Maine School Survey Respondents: 1998/1999

Demographic Characteristic	Unweighted Number	Unweighted Percent	Weighted Percent
Total Maine	22,162	100	100
Race/Ethnicity			
White	19,844	89.5	90.4
Nonwhite	1,586	7.2	6.8
Missing	732	3.3	2.8
Gender			
Male	10,234	46.2	50.5
Female	11,524	52.0	47.7
Missing	404	1.8	1.8
Age (Years)			
11 or younger	2,881	13.0	9.5
12	4,100	18.5	14.1
13	4,179	18.9	14.7
14	2,917	12.2	13.7
15	2,577	11.6	14.7
16	2,360	10.6	14.0
17	2,019	9.1	12.2
18 or older	1,059	4.8	6.8
Missing	70	0.3	0.3
Grade in School			
6th	4,415	19.9	14.6
7th	4,384	19.8	15.0
8th	4,094	18.5	14.9
9th	2,534	11.4	15.5
10th	2,528	11.4	14.1
11th	2,139	9.7	13.0
12th	1,952	8.8	12.4
Missing	116	0.5	0.5

Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

other drugs (i.e., cocaine, lysergic acid diethylamide [LSD] or other psychedelics, and speed or amphetamines), and

tobacco (including cigarettes and smokeless tobacco).

Data were used to develop prevalence estimates for the lifetime and past month periods (as available). Scales designed to estimate the patterns of use were also developed.

In addition, prevalence estimates of various violent and prohibited behaviors in the year prior to the survey were developed. Estimates were produced for

attacking others with the intention of hurting them,
carrying a handgun,
getting drunk or high at school,
getting suspended from school,
stealing or trying to steal a motor vehicle,
selling illegal drugs, and
being arrested.

Scales designed to estimate the patterns of violent and prohibited behaviors were also developed.

Prevalence estimates of all the substance use variables were calculated for the State as a whole and within demographic subgroups (i.e., gender, race/ethnicity, age, and grade level). Chi squared tests were used to test for significant differences between groups ($p<.05$). Such comparisons indicate which groups were more likely than others to use alcohol and other drugs.

Estimates of the percentage of students varying on community, school, family, and peer-individual risk and protective factors are presented for the total population and by grade. Odds ratios between the risk and protective factors and (1) alcohol use, (2) drug use, (3) violent behavior, and (4) prohibited behavior are also calculated.

1.4.2 Analysis Software and Estimation Procedures

The SUrvey DAta ANalysis (SUDAAN) software system, which was designed and developed by RTI, is one of the most powerful and efficient systems of its kind (Shah, Barnwell, & Bieler, 1997). For this study, SUDAAN was used to analyze the school survey data. SUDAAN is unique in its ability to handle many different complex sample designs, and all SUDAAN procedures allow users to save output files for efficient computer production of report tables.

In this report, estimates that were considered to be unreliable are not presented. More specifically, estimates were suppressed that could not be reported with confidence because they either were based on small sample sizes ($n<30$) or had large sampling errors. The rules for classifying estimates as unreliable are explained in Appendix B. Unreliable estimates, which were omitted, are noted by a single plus sign (+) in the exhibits. Very small estimates (i.e., <0.05%) that were not suppressed by the rules, but that rounded to zero, also were omitted from the exhibits and are shown as two plus signs (++).

1.5 Limitations of the Data

The Maine Youth Drug and Alcohol Use Survey is a large and extremely useful survey for the people of Maine. It is an excellent source of data appropriate for assessing substance abuse and prevention needs among Maine's school-aged youths. However, some limitations with this data source should be noted.

One limitation of this study is the exclusive focus on adolescents in school. With such a focus, adolescent subpopulations with concentrated numbers of problem users may be missed. These subpopulations include school dropouts, and homeless and runaway youths–all of whom are likely to be undercounted by school surveys.

The subpopulation of most concern not captured by school-based surveys is school dropouts. There has been some controversy surrounding the belief that dropouts have the greatest drug problems, but most of the research to date has shown that dropouts are more likely to be substance users than those who remain in school. Mensch and Kandel (1988) found that dropouts were more likely than graduates to use cigarettes and other drugs. Studies have also shown that drug use often precedes dropping out of school (Friedman, Glickman, & Utada, 1985; Mensch & Kandel, 1988), but drug use has not been proven to be a definitive cause of dropping out of school. Nevertheless, it is reasonable to assume that some of the problem users who are *at risk* for dropping out, but have not yet done so, will be captured in this survey. Results, however, can only be generalized to the population of adolescents who are attending school.

Finally, it should be noted that the questionnaire measured self-reported behavior. Several researchers have concluded that adolescents' self-reports of substance use are reliable and valid (Akers, Massey, Clarke, & Lauer, 1983; Martin & Newman, 1988; Nurco, 1985; Single, Kandel, & Johnson, 1975; Smart, 1975; Whitehead & Smart, 1972). Caution should be exercised, however, in interpreting these data because of respondents' tendencies to underreport undesirable behaviors and to have difficulty remembering complicated information, such as age at first use (Bailey, Flewelling, & Rachal, 1992b).

2. PREVALENCE AND CORRELATES OF ALCOHOL, TOBACCO, AND OTHER DRUG USE

This chapter presents data about the use of alcohol, tobacco, and other drugs among Maine's 6th to 12th grade student population. To determine the characteristics of students who were using alcohol, tobacco, and other drugs, this chapter looks at each of the prevalence categories separately by gender, race/ethnicity, age, and grade in school. To determine how Maine students compared to students nationwide, the 1998/1999 data on lifetime use and current use are compared with the national Monitoring the Future (MTF) data for the same time period. Finally, the results are compared with previous administrations of the Maine Youth Drug and Alcohol Use Survey to examine changes within Maine between 1995 and 1998/1999.

2.1 Alcohol

Alcohol use exposes adolescents to many long- and short-term dangers. Alcohol use is a major contributing factor in approximately one half of all homicides and suicides, and 30% of all motor vehicle crashes, which are the leading causes of death and disability among young people in the United States. The 1997 national drug control strategy profile reported that 7,738 intoxicated drivers between the ages of 16 and 20 were fatally injured in 1996 in automobile accidents (ONDCP, 1997, p. 16). Alcohol use is correlated with problem behaviors, such as the following:

poor school performance (Simons-Morton et al., 1999),

violence (Dawkins, 1997; Dukarm et al., 1996; Orpinas, Basen-Engquist, Grunbaum, & Parcel, 1995), and

high-risk sexual behaviors (Fergusson & Lynskey, 1996).

Alcohol use also has been found to be associated with the initiation of other drug use, such as use of marijuana (Kandel & Yamaguchi, 1993; Merrill, Kleber, Shwartz, Liu, & Lewis, 1999).

2.1.1 Lifetime Alcohol Use

Exhibit 2.1 shows that approximately 6 out of 10 Maine students had ever had a drink of alcohol in their life ("lifetime use"), beyond just a few sips of alcohol; this estimate translates to about 69,400 alcohol users among the Maine student population up to this point in their lifetime. There was little difference in gender use patterns (60% of males vs. 57% of females) or race/ethnicity use patterns.

Exhibit 2.1 Prevalence of Use and Estimated Numbers of Alcohol Users (to the Nearest Hundred) in the Lifetime and Past Month Among the Maine Student Population in Grades 6-12, by Selected Demographic Characteristics: 1998/1999

	Lifetime			Past Month		
Demographic Characteristic	**Percentage**	**Estimated Number**	**95% CI**	**Percentage**	**Estimated Number**	**95% CI**
Total Maine	58.4	69,400	68,500 - 70,300	31.6	37,600	36,700 - 38,500
Gender						
Male	60.0	35,900	35,200 - 36,500	32.0	19,200	18,500 - 19,800
Female	56.8	32,500	31,800 - 33,100	31.2	17,800	17,200 - 18,400
Race/Ethnicity						
White	58.7	63,300	62,400 - 64,200	31.8	34,300	33,400 - 35,200
Nonwhite	59.1	4,700	4,400 - 4,900	32.6	2,600	2,400 - 2,800
Age (Years)						
11 or younger	22.0	2,400	2,200 - 2,600	6.3	700	600 - 800
12	31.1	5,100	4,800 - 5,300	11.8	1,900	1,800 - 2,100
13	47.3	8,300	8,000 - 8,600	21.4	3,700	3,500 - 4,000
14	59.2	9,700	9,400 - 10,100	30.5	5,000	4,700 - 5,300
15	66.8	11,800	11,500 - 12,200	37.9	6,700	6,300 - 7,100
16	76.6	12,900	12,600 - 13,200	44.4	7,500	7,100 - 7,900
17	82.0	12,100	11,800 - 12,300	50.2	7,400	7,000 - 7,700
18 or older	85.3	7,000	6,800 - 7,200	56.1	4,600	4,300 - 4,900
Grade in School						
6th	24.9	4,100	3,900 - 4,400	8.0	1,300	1,200 - 1,500
7th	36.3	6,400	6,100 - 6,700	14.9	2,600	2,400 - 2,800
8th	53.3	9,400	9,100 - 9,800	25.8	4,600	4,300 - 4,900
9th	63.5	11,800	11,400 - 12,200	34.7	6,400	6,100 - 6,800
10th	71.3	12,100	11,800 - 12,400	39.9	6,800	6,400 - 7,100
11th	79.7	12,500	12,200 - 12,800	48.4	7,600	7,200 - 8,000
12th	84.5	12,700	12,400 - 13,000	53.8	8,100	7,700 - 8,500

Note: Estimated number rounded to the nearest hundred. The 95% CI= 95% confidence interval (to the nearest hundred) of the estimated number of users. Unweighted numbers of respondents are shown in Table 1.1.

Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

As would be expected, prevalence of lifetime alcohol use increased by age and grade categories. The largest increase was between the 7th and 8th graders' use levels (36% and 53%, respectively). The higher rates of lifetime alcohol use with increased age may reflect increased opportunities for older youths to try alcohol. Nevertheless, the rates by grade level suggest that over 60% of Maine's youths will have tried alcohol by the time they finish 9th grade, and 80% will have tried alcohol by the time they finish 11th grade.

2.1.2 Past Month Use

As shown in Exhibit 2.1, almost one third, or 37,600, students had consumed at least one drink in the month prior to the 1998/1999 survey (i.e., currently used alcohol). This estimated number of past month alcohol users comprises about 54% of the 69,400 lifetime alcohol users; stated another way, approximately 54% of the lifetime alcohol users reported use in the past month. There were no differences in current use by gender or race/ethnicity. As in lifetime use, rates for current use also increased progressively by age and grade. Notably, about half of the youths in the 11th and 12th grades reported drinking alcohol in the past month.

2.1.3 Binge Drinking

Exhibit 2.2 presents the prevalence of binge drinking (i.e., consuming five or more drinks of alcohol in a row) among Maine students during the 2-week period before the survey. As shown, an estimated 15% of students met the definition of binge drinking in the preceding 2 weeks. Although males were more likely than females to report binge alcohol use (17% vs. 14%, respectively), the difference was small. As students' grade increased, so did their rates of binge drinking. About 30% of the youths in the 12th grade reported binge use. This rate was approximately four times the rate for youths in the 8th grade (9%) and two times the rate for those in the 9th grade (16%). Around 20% and 27% of the 10th and 11th graders, respectively, reported binge drinking in the past 2 weeks.

2.1.4 History of Alcohol Use

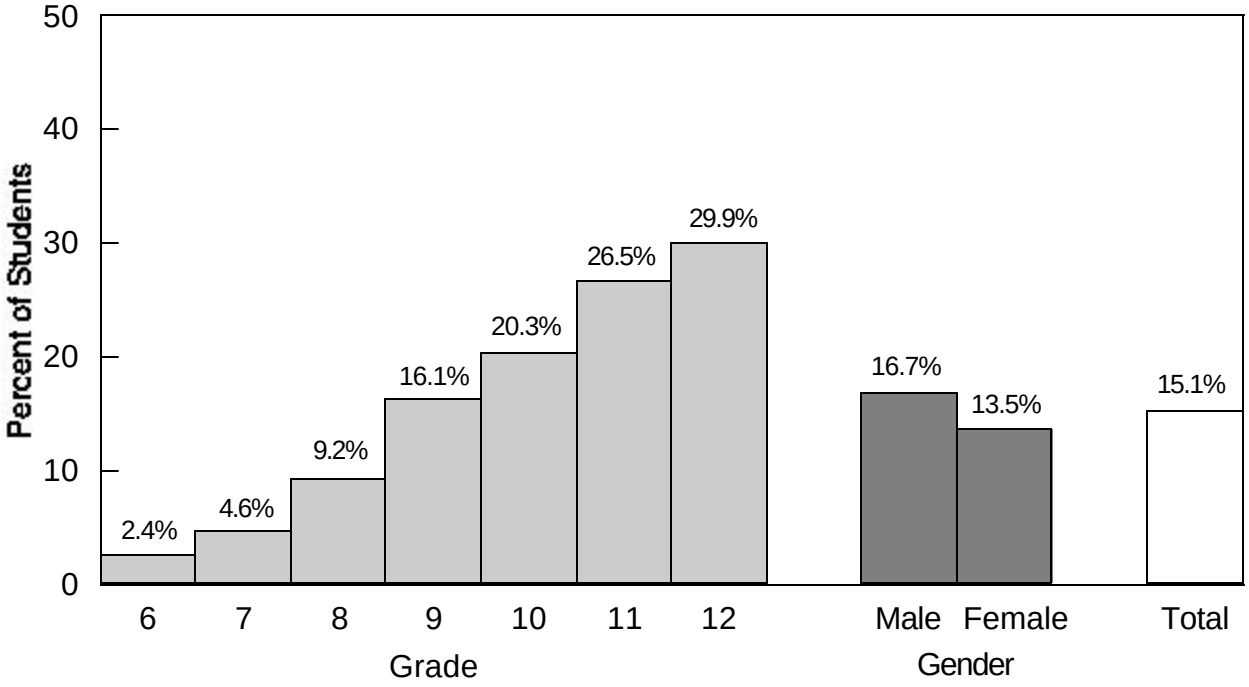
To examine the patterns of alcohol use, an alcohol scale with four mutually exclusive categories of use was developed:

no use in the lifetime,

prior use (defined as use in the lifetime but not the past month),

recent use (defined as use in the past month but not frequent use), and

Exhibit 2.2 Prevalence of Binge Drinking in the Past 2 Weeks Among the Maine Student Population in Grades 6-12, by Grade and Gender: 1998/1999



Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

frequent use (defined as use of alcohol 10 or more times in the past 30 days or binge drinking three or more times in the preceding 2 weeks).

Overall, about 40% of Maine's youths reported no use, and about a quarter reported prior use and recent use (Exhibit 2.3). Approximately 6% frequently used alcohol. As expected, as grade level increased, those in the no-use category decreased, while those in all other use categories increased. Frequent use ranged from less than 1% among 6th graders to over 12% of 12th graders.

Patterns of use were also examined by grade categories, comparing students in grades 6 through 8 with those in grades 9 through 12. Less than half as many students in the older category reported no use compared to the younger group (26% vs. 62%, respectively). More than four times as many older students reported frequent use compared to younger students (9% vs. 2%, respectively).

Exhibit 2.3 Composite Scale: Alcohol Use Among the Maine Student Population in Grades 6-12, by Grade: 1998/1999

	Alcohol Use Scale			
Grade	**No Use[1]**	**Prior Use[2]**	**Recent Use[3]**	**Frequent Use[4]**
Total Maine	41.6	26.8	25.5	6.1
Grade in School				
6th	75.1	16.8	7.3	0.8
7th	63.7	21.4	13.2	1.7
8th	46.7	27.4	22.0	3.9
9th	36.5	28.8	27.7	6.9
10th	28.7	31.5	32.2	7.7
11th	20.3	31.5	38.1	10.2
12th	15.5	30.8	41.3	12.4
Grade Categories				
6th - 8th	61.6	22.0	14.3	2.2
9th - 12th	25.9	30.6	34.4	9.1

[1]Never used in the lifetime.
[2]Used in the lifetime, but not past 30 days.
[3]Used at least once in the past 30 days.
[4]Used 10 or more times in the past 30 days or binge drinking three or more times in the past 2 weeks.

Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

2.2 Other Drug Use

Indications are that other drug use among the high school population across the United States reached peak levels in 1996 and 1997, slightly declined in 1998 and remained steady in 1999. The 1999 MTF study reported that the recent use of inhalants among American adolescents peaked in 1995, LSD and other hallucinogens in 1996, and marijuana and amphetamines in 1996 and 1997, depending on the age of the student (Johnston et al., 1999). Results for cocaine varied by grade and did not show a clear pattern. Although adolescent drug use has shown recent declines, the study still reported that by the time high school students graduate, more than half have tried other drugs at least once (Johnston et al., 1999). The use of other drugs has been associated with many negative outcomes: Users have shown lower school performance and higher delinquency than nonusers (Kandel & Davies, 1996), a higher likelihood to engage in physical fighting (Dukarm et al., 1996), and a higher likelihood to carry a weapon on school property (DuRant, Kahn, Beckford, & Woods, 1997).

2.2.1 Marijuana

Lifetime Marijuana Use. Approximately 29% of Maine's school-aged population reported having tried marijuana at least once in their lifetime (Exhibit 2.4); this estimate translates to approximately 34,400 youths. There was little difference between males and females (31% vs. 27%, respectively) and whites and nonwhites (29% vs. 32%, respectively). Percentages of students reporting use increased with age and grade. Lifetime use of marijuana more than doubled between grades 6 and 7 (2% and 7%) and grades 7 and 8 (7% and 17%), and almost doubled between grades 8 and 9 (17% and 31%). Notably, over half of those in grade 11 (51%) and grade 12 (58%) reported having used marijuana in their lifetime.

Past Month Marijuana Use. Nearly 16% of students reported using marijuana in the 30 days prior to the survey (Exhibit 2.4). This represents approximately 18,700 youths with past month marijuana use. Although males were more likely to report past month use than females (17% vs. 14%, respectively), the difference was small. Whites and nonwhites reported similar rates (16% vs. 19%, respectively). Again, percentages of students reporting use increased with age and grade. Past month use increased by the highest percentage between grades 8 and 9 (8% vs. 19%, respectively). Over one quarter of 11th and 12th grade students (28% and 30%, respectively) reported using marijuana in the month preceding the survey.

2.2.2 Inhalants

Lifetime Inhalant Use. About 15% of Maine's students had ever tried inhalants (i.e., sniffing glue or gas, breathing the contents of aerosol spray cans, or inhaling paints or sprays); this estimate translates to approximately 18,400 youths (Exhibit 2.5). Males (16%) and females (15%) used inhalants at roughly equivalent rates, but nonwhites (19%) reported a higher rate of lifetime use than whites (15%). Unlike other substances, the percentages of students reporting inhalant use did not increase consistently with age and grade. Use increased from grade 6 to grade 8 (12% to 20%), then decreased from grade 8 to grade 11 (20% to 14%).

Past Month Inhalant Use. Approximately 5%, or 6,000, reported using inhalants in the 30 days prior to the 1998/1999 survey (Exhibit 2.5). There was little difference in past month use by gender or race/ethnicity. Percentages of students reporting use increased between grades 6 and 8 (6% to 8%), then decreased by grades 11 and 12 (3%).

2.2.3 Other Drugs

Approximately 4% of Maine's students had ever tried cocaine, including both its powder form and crack, 7% had ever tried LSD or other psychedelics, and 8% had tried speed or

Exhibit 2.4 Prevalence of Use and Estimated Numbers of Marijuana Users (to the Nearest Hundred) in the Lifetime and Past Month Among the Maine Student Population in Grades 6-12, by Selected Demographic Characteristics: 1998/1999

	Lifetime			Past Month		
Demographic Characteristic	**Percentage**	**Estimated Number**	**95% CI**	**Percentage**	**Estimated Number**	**95% CI**
Total Maine	28.8	34,400	33,500 - 35,300	15.7	18,700	18,000 - 19,500
Gender						
Male	30.5	18,400	17,700 - 19,000	17.1	10,300	9,800 - 10,900
Female	27.0	15,500	15,000 - 16,100	14.2	8,100	7,700 - 8,600
Race/Ethnicity						
White	28.8	31,300	30,400 - 32,100	15.6	16,900	16,200 - 17,600
Nonwhite	32.0	2,600	2,300 - 2,800	19.2	1,500	1,400 - 1,700
Age (Years)						
11 or younger	1.5	200	100 - 200	0.4	0	0 - 100
12	4.6	800	600 - 900	2.2	400	300 - 400
13	11.8	2,100	1,900 - 2,300	5.6	1,000	900 - 1,100
14	22.7	3,800	3,500 - 4,100	12.0	2,000	1,800 - 2,200
15	35.8	6,400	6,000 - 6,800	21.1	3,800	3,400 - 4,100
16	46.9	7,900	7,600 - 8,300	26.4	4,500	4,100 - 4,800
17	56.0	8,300	7,900 - 8,700	29.4	4,400	4,000 - 4,700
18 or older	59.7	4,900	4,700 - 5,200	33.0	2,700	2,500 - 3,000
Grade in School						
6th	2.4	400	300 - 500	1.2	200	100 - 300
7th	6.7	1,200	1,100 - 1,300	3.2	600	500 - 700
8th	17.4	3,100	2,900 - 3,300	8.2	1,500	1,300 - 1,600
9th	31.3	5,900	5,500 - 6,300	18.5	3,500	3,200 - 3,800
10th	40.8	7,000	6,600 - 7,400	22.7	3,900	3,600 - 4,200
11th	50.7	8,000	7,600 - 8,400	28.5	4,500	4,200 - 4,900
12th	57.8	8,700	8,300 - 9,100	30.4	4,600	4,200 - 5,000

Note: Estimated number rounded to the nearest hundred. The 95% CI= 95% confidence interval (to the nearest hundred) of the estimated number of users. Unweighted numbers of respondents are shown in Table 1.1.

Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

Exhibit 2.5 Prevalence of Use and Estimated Numbers of Inhalant Users (to the Nearest Hundred) in the Lifetime and Past Month Among the Maine Student Population in Grades 6-12, by Selected Demographic Characteristics: 1998/1999

	Lifetime			Past Month		
Demographic Characteristic	**Percentage**	**Estimated Number**	**95% CI**	**Percentage**	**Estimated Number**	**95% CI**
Total Maine	15.4	18,400	17,700 - 19,100	5.1	6,000	5,600 - 6,400
Gender						
Male	15.9	9,500	9,000 - 10,000	5.2	3,100	2,800 - 3,400
Female	14.9	8,500	8,100 - 9,000	4.9	2,800	2,600 - 3,100
Race/Ethnicity						
White	15.1	16,400	15,700 - 17,000	4.9	5,300	4,900 - 5,700
Nonwhite	19.1	1,500	1,300 - 1,700	6.8	500	400 - 700
Age (Years)						
11 or younger	10.8	1,200	1,100 - 1,300	4.9	500	400 - 600
12	13.4	2,200	2,000 - 2,400	5.5	900	800 - 1,000
13	17.7	3,100	2,900 - 3,300	7.5	1,300	1,200 - 1,500
14	18.2	3,000	2,700 - 3,300	7.2	1,200	1,000 - 1,400
15	16.4	2,900	2,600 - 3,200	5.0	900	700 - 1,100
16	14.5	2,500	2,200 - 2,700	3.6	600	500 - 800
17	15.6	2,300	2,000 - 2,600	2.5	400	300 - 500
18 or older	14.1	1,200	1,000 - 1,400	2.8	200	200 - 300
Grade in School						
6th	12.0	2,000	1,800 - 2,200	5.6	900	800 - 1,100
7th	14.4	2,500	2,300 - 2,800	5.8	1,000	900 - 1,200
8th	19.9	3,500	3,300 - 3,800	8.3	1,500	1,300 - 1,700
9th	16.8	3,100	2,900 - 3,500	5.9	1,100	900 - 1,300
10th	15.6	2,700	2,400 - 3,000	3.8	700	500 - 800
11th	14.1	2,200	2,000 - 2,500	2.6	400	300 - 600
12th	14.2	2,100	1,900 - 2,400	2.7	400	300 - 600

Note: Estimated number rounded to the nearest hundred. The 95% CI= 95% confidence interval (to the nearest hundred) of the estimated number of users. Unweighted numbers of respondents are shown in Table 1.1.

Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

amphetamines (Exhibit 2.6). In the 30 days prior to the 1998/1999 survey, 1.3% of the Maine school-aged population reported using cocaine, 2.7% reported using LSD or other psychedelics, and 2.6% reported using speed or amphetamines.

2.2.4 History of Drug Use

As with alcohol, a drug use scale was developed in order to examine the patterns of use. There were four mutually exclusive categories of use:

no use in the lifetime,

prior use (defined as use in the lifetime but not the past month),

recent use (defined as use in the past month but not frequent use), and

frequent use (defined as use of any other drug 10 or more times in the past 30 days, or use of cocaine three or more times in the past 30 days).

Overall, about 63% of Maine' s youths reported no use of drugs, 17% prior use, 13% recent use, and 7% frequent use (Exhibit 2.7). As expected, as grade level increased, those in the no-use category decreased. Those in all other use categories increased with increasing grade, with the exception of frequent use between grades 11 and 12, which decreased by a fraction of a percentage point. Frequent use ranged from about 1% among 6th and 7th graders to about 14% of 11th and 12th graders. Frequent use more than doubled between grades 7 and 8 (1% to 4%) and between grades 8 and 9 (4% to 9%).

Patterns of use were also examined by grade categories, comparing students in grades 6 through 8 with those in grades 9 through 12. As was expected, a lower percentage of students in the older category reported no use compared to the younger group (51% vs. 79%, respectively). About five times as many older students reported frequent use compared to younger students (11% vs. 2%, respectively).

2.3 Tobacco

Cigarette use among youths in their teenage years can cause major problems, such as a lifelong habit of smoking. According to the ONDCP (1997, p. 16), 3,000 children begin smoking regularly each day in the United States, and approximately 4.5 million American children under age 18 currently smoke. Furthermore, like alcohol, cigarette use is associated with the initiation of other drug use, including the use of marijuana (Kandel & Yamaguchi, 1993; Merrill et al., 1999) as well as other drugs (Everett, Giovino, Warren, Crossett, & Kann,

Exhibit 2.6 Prevalence of Use and Estimated Numbers of Other Drug Users (to the Nearest Hundred) in the Lifetime and Past Month Among the Maine Student Population in Grades 6-12: 1998/1999

	Lifetime			Past Month		
Substance Used	**Percentage**	**Estimated Number**	**95% CI**	**Percentage**	**Estimated Number**	**95% CI**
Cocaine	4.3	5,100	4,700 - 5,500	1.3	1,500	1,300 - 1,800
LSD or Other Psychedelics	7.3	8,800	8,200 - 9,300	2.7	3,300	3,000 - 3,600
Speed or Amphetamines	8.1	9,500	9,000 - 10,100	2.6	3,100	2,800 - 3,400

Note: Estimated number rounded to the nearest hundred. The 95% CI= 95% confidence interval (to the nearest hundred) of the estimated number of users. Unweighted numbers of respondents are shown in Table 1.1.

--Data not available.

Source: Maine Youth Drug and Alcohol Survey: 1998/1999.

Exhibit 2.7 Composite Scale: Drug Use (Not Including Alcohol and Tobacco) Among the Maine Student Population in Grades 6-12, by Grade: 1998/1999

	Drug Use Scale			
Grade	**No Use[1]**	**Prior Use[2]**	**Recent Use[3]**	**Frequent Use[4]**
Total Maine	63.0	16.7	12.9	7.4
Grade in School				
6th	86.3	6.7	5.5	1.4
7th	81.2	10.1	7.2	1.4
8th	69.3	15.7	11.3	3.8
9th	61.0	15.9	14.5	8.6
10th	54.2	20.2	16.2	9.4
11th	46.6	22.4	17.1	13.9
12th	40.5	26.9	18.9	13.7
Grade Categories				
6th - 8th	78.6	11.0	8.1	2.2
9th - 12th	51.2	21.0	16.5	11.2

Note: Data entries are percentages.

[1]Never used in the lifetime.
[2]Used at least one drug in the lifetime, but not past 30 days.
[3]Used at least one drug in the past 30 days.
[4]Used any drug 10 or more times in the past 30 days, or used cocaine three or more times in the past 30 days.

Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

1998; Lindsay & Raney, 1997). Smoking has also been associated with poorer grade performance and the higher use of alcohol (Dappen, Schwartz, & O' Donnell, 1996).

2.3.1 Cigarette Smoking

Lifetime Cigarette Smoking. As shown in Exhibit 2.8, about 45% of Maine' s students had ever smoked cigarettes; this estimate translates to 53,400 cigarette users in the lifetime. There was little difference in rates of lifetime use by gender or race/ethnicity; however, prevalence rates increased noticeably by age and grade categories. The largest increases in use occurred between the 7th (26%) and 8th (41%) grade categories. Readers are cautioned that any cigarette use qualified as lifetime use, even if the student only took one or two puffs. Consequently, the 45% of Maine students who had ever tried a cigarette includes students who tried cigarettes but did not progress to regular cigarette smoking. Nevertheless, this rate of lifetime cigarette use suggests that many Maine students have had access to cigarettes despite the illegality of cigarette sales to youths under the age of 18 years.

Exhibit 2.8 Prevalence of Use and Estimated Numbers of Cigarette Users (to the Nearest Hundred) in the Lifetime and Past Month Among the Maine Student Population in Grades 6-12, by Selected Demographic Characteristics: 1998/1999

Demographic Characteristic	Lifetime			Past Month		
	Percentage	Estimated Number	95% CI	Percentage	Estimated Number	95% CI
Total Maine	44.8	53,400	52,500 - 54,300	19.3	23,000	22,200 - 23,800
Gender						
Male	44.2	26,400	25,700 - 27,100	18.9	11,300	10,700 - 11,900
Female	45.6	26,200	25,500 - 26,800	19.9	11,400	10,900 - 11,900
Race/Ethnicity						
White	44.8	48,400	47,500 - 49,400	19.4	21,000	20,200 - 21,700
Nonwhite	47.6	3,800	3,600 - 4,000	20.0	1,600	1,400 - 1,800
Age (years)						
11 or younger	11.5	1,300	1,100 - 1,400	2.3	300	200 - 300
12	20.1	3,300	3,100 - 3,500	5.8	1,000	800 - 1,100
13	35.5	6,200	5,900 - 6,500	11.1	1,900	1,800 - 2,100
14	44.8	7,400	7,000 - 7,700	16.3	2,700	2,400 - 2,900
15	53.1	9,400	9,000 - 9,800	23.7	4,200	3,900 - 4,500
16	60.8	10,200	9,800 - 10,600	28.9	4,900	4,500 - 5,200
17	65.6	9,700	9,300 - 10,100	32.5	4,800	4,400 - 5,200
18 or older	71.0	5,900	5,600 - 6,100	39.5	3,300	3,000 - 3,500
Grade in School						
6th	14.2	2,400	2,200 - 2,600	3.3	500	500 - 600
7th	26.0	4,600	4,300 - 4,900	8.2	1,400	1,300 - 1,600
8th	40.9	7,300	7,000 - 7,600	13.6	2,400	2,200 - 2,600
9th	49.7	9,300	8,900 - 9,700	21.2	3,900	3,600 - 4,300
10th	57.4	9,800	9,400 - 10,100	25.2	4,300	4,000 - 4,600
11th	61.4	9,700	9,300 - 10,000	30.9	4,900	4,500 - 5,200
12th	68.3	10,300	9,900 - 10,600	35.8	5,400	5,000 - 5,800

Note: Estimated number rounded to the nearest hundred. The 95% CI= 95% confidence interval (to the nearest hundred) of the estimated number of users. Unweighted numbers of respondents are shown in Table 1.1.

Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

Past Month Cigarette Smoking. Nearly one fifth (19%), or 23,000, of Maine' s students smoked cigarettes in the 30 days prior to the survey (i.e., they were "current" smokers) (Exhibit 2.8). This estimate of 23,000 past month smokers constitutes over two fifths of the 53,400 lifetime smokers (i.e., [23,000/53,400] x 100 = 43%); therefore, two fifths of those who had ever smoked were current smokers. Again, there was little difference in current use between the gender or racial/ethnic categories. As with lifetime use, rates of current cigarette smoking increased by age and grade categories. For example, 3% of the youths in the 6th grade, 14% of the youths in the 8th grade, 25% of those in the 10th grade, and 36% of those in 12th grade had smoked a cigarette in the past month.

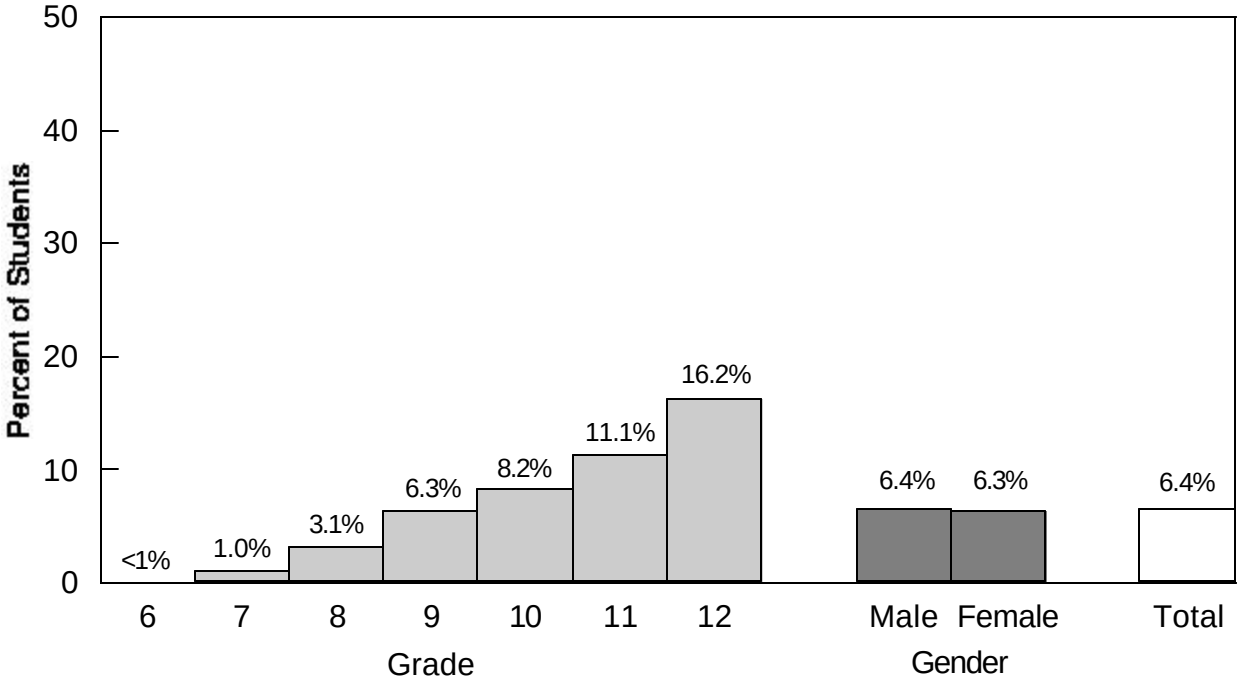
Heavy Smoking. Exhibit 2.9 displays the prevalence of smoking more than five cigarettes per day, by grade and by gender. A total of 6% of Maine' s students reported heavy smoking. As with lifetime and past month smoking, the rate of smoking more than five cigarettes per day increased by grade category. Less than 1% of 6th grade students were heavy smokers. The rate of daily smoking tripled between grades 7 (1.0%) and 8 (3.1%), and doubled between grades 8 and 9 (6.3%). Over 16% of 12 graders reported smoking more than 5 cigarettes each day. Overall, males and females reported comparable rates of heavy smoking.

2.3.2 Smokeless Tobacco Use

Lifetime Smokeless Tobacco Use. About 15% of Maine' s students had ever tried smokeless tobacco products (i.e., chew, snuff, plug, dipping tobacco, or chewing tobacco); this estimate translates to approximately 18,000 youths (Exhibit 2.10). Males (22%) used smokeless tobacco at a much higher rate than females (8%), but whites (15%) and nonwhites (18%) were more similar in their reported lifetime use. The percentages of students reporting lifetime use increased with age and grade. Use increased incrementally from grades 6 to 11 (4% to 21%) by between 2% and 4% per year. The greatest percentage increase occurred between the 11th and 12th grades; 21% of students used smokeless tobacco in the 11th grade and 30% used these products in the 12th grade.

Past Month Smokeless Tobacco Use. Approximately 5%, or 6,200, reported using smokeless tobacco in the 30 days prior to the survey (Exhibit 2.10). Males reported past month use at about four times the rate of females (8% and 2%, respectively). Again, however, there was little difference between whites and nonwhites. Percentages of students reporting use increased at each age and grade category. Rates of current smokeless tobacco use ranged from 1.3% of 6th grade students to 10% of 12th grade students.

Exhibit 2.9 Prevalence of Smoking More Than Five Cigarettes Per Day Among the Maine Student Population in Grades 6-12, by Grade and Gender: 1998/1999



Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

2.4 Comparisons of 1998/1999 Maine Prevalence Rates with 1998 National and 1995 and 1996 Maine Prevalence Rates

To provide a broader perspective about the rates of substance use among Maine students, a comparison was made with data collected nationally through the 1998 MTF study. Additionally, comparisons between data collected from both the 1995 and 1996 administrations of the Maine Youth Drug and Alcohol Use Survey to examine differences in prevalence rates within Maine between 1995 and 1998/1999.

2.4.1 National Comparisons

Maine students reported roughly comparable rates of lifetime and past month substance use as did students in the nationally representative MTF sample (Exhibit 2.11). The only notable exceptions were for 12th grade lifetime alcohol and marijuana use, and 10 th and 12th grade past month marijuana use, where rates among Maine students were somewhat higher than the national average. It should also be noted that rates of past month cigarette use were slightly *lower* for Maine' s 8^{h} and 10th graders (13% and 25%, respectively) than the national average (19% and 28%, respectively).

Exhibit 2.10 Prevalence of Use and Estimated Numbers of Smokeless Tobacco Users (to the Nearest Hundred) in the Lifetime and Past Month Among the Maine Student Population in Grades 6-12, by Selected Demographic Characteristics: 1998/1999

	Lifetime			Past Month		
Demographic Characteristic	**Percentage**	**Estimated Number**	**95% CI**	**Percentage**	**Estimated Number**	**95% CI**
Total Maine	15.0	18,000	17,300 - 18,800	5.2	6,200	5,800 - 6,700
Gender						
Male	22.2	13,400	12,700 - 14,000	8.1	4,800	4,400 - 5,300
Female	7.6	4,400	4,000 - 4,700	2.2	1,300	1,100 - 1,500
Race/Ethnicity						
White	15.0	16,200	15,500 - 17,000	5.1	5,600	5,100 - 6,000
Nonwhite	17.7	1,400	1,200 - 1,600	6.6	500	400 - 600
Age (years)						
11 or younger	3.1	300	300 - 400	0.9	100	100 - 100
12	5.1	800	700 - 1,000	1.8	300	200 - 400
13	9.4	1,600	1,500 - 1,800	3.8	700	600 - 800
14	12.9	2,100	1,900 - 2,400	4.7	800	600 - 900
15	15.8	2,800	2,500 - 3,100	5.4	1,000	800 - 1,200
16	20.3	3,400	3,100 - 3,800	6.6	1,100	900 - 1,300
17	26.8	4,000	3,600 - 4,300	9.2	1,400	1,100 - 1,600
18 or older	34.0	2,800	2,500 - 3,100	11.5	900	800 - 1,200
Grade in School						
6th	4.1	700	600 - 800	1.3	200	200 - 300
7th	7.1	1,300	1,100 - 1,400	2.8	500	400 - 600
8th	11.3	2,000	1,800 - 2,200	4.4	800	700 - 900
9th	15.2	2,800	2,600 - 3,100	5.3	1,000	800 - 1,200
10th	18.8	3,200	2,900 - 3,500	6.4	1,100	900 - 1,300
11th	21.3	3,400	3,000 - 3,700	7.4	1,200	1,000 - 1,400
12th	30.2	4,500	4,200 - 4,900	9.6	1,400	1,200 - 1,700

Note: Estimated number rounded to the nearest hundred. The 95% CI= 95% confidence interval (to the nearest hundred) of the estimated number of users. Unweighted numbers of respondents are shown in Table 1.1.

Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

Exhibit 2.11 Prevalence of Lifetime and Past Month Substance Use Among the Maine Student Population Versus the National Student Population: 1998/1999

	Lifetime		Past Month	
Substance Used/Grade in School	**Maine**	**National**	**Maine**	**National**
Alcohol				
8th	53	53	25	23
10th	71	70	40	39
12th	85	81	54	52
Marijuana				
8th	17	22	8	10
10th	41	40	23	19
12th	58	49	30	23
Inhalants				
8th	20	21	8	5
10th	16	18	4	3
12th	14	15	3	2
Cocaine				
8th	3	5	1	1
10th	5	7	1	2
12th	7	9	2	2
Cigarettes				
8th	41	46	13	19
10th	57	58	25	28
12th	68	65	36	35

Note: Data entries are percentages. Unweighted numbers of respondents from Maine are shown in Table 1.1.

--Data not available.

Sources: Maine data: Maine Youth Drug and Alcohol Use Survey: 1998/1999.
National data: Monitoring the Future: 1998.

2.4.2 Maine Comparisons

The Maine Youth Drug and Alcohol Use Survey was administered in 1995, 1996, and 1998/1999. These earlier data provide an important comparison for the 1998/1999 values to monitor any changes in drug use behaviors over time among Maine school students. Although such comparisons can be useful, it is very important to note that there were two significant changes in methodology between 1996 and 1998/1999 that may have impacted the results; therefore, any comparisons between 1998/1999 and earlier data should be made with caution.

As described in Chapter 1, the first methodological difference between 1998/1999 and the earlier survey administrations was related to sampling. In previous administrations, a representative, random sample of schools was selected. However, in 1998/1999, all schools were invited to participate and students in those that agreed to participate were surveyed. This volunteer sample at the school level may have systematically biased the type of students who were surveyed. Namely, schools with youths at higher risk for substance abuse may not have chosen to participate.

The second important change in the methodology concerned the parental consent procedure. The earlier surveys employed a passive consent protocol, in which parents were notified that their children would be surveyed unless they expressly returned a form to disallow their children from participating in the survey. In 1998/1999, an active parental consent protocol was implemented; active consent requires parents to return a form to allow their children to participate. This change in consent protocol may have affected the results of the survey if the parents of certain types of students were more or less likely to turn in the form and grant permission for their child to participate.

Because there is no way to determine how these two important differences in methodology affected the results of the survey, data comparisons between 1998/1999 and previous administrations should be viewed with caution. It is impossible to tell if changes in prevalence rates are due to procedural changes or to true changes in substance use. With that said, the rates of use of most substances and for the lower grades were significantly higher in 1995 and 1996 than in 1998/1999; rates of use among the higher grades (i.e., 11 and 12) remained relatively consistent (see Exhibit 2.12).

2.5 Summary

The most commonly used substances among Maine students in grades 6 to 12 were alcohol, cigarettes, and marijuana. The majority (58%) used at least some alcohol in their lifetime, and 32% used it in the month before the survey. In addition, approximately 15%

Exhibit 2.12 Prevalence of Lifetime and Past Month Substance Use Among the Maine Student Population in Grades 6-12: 1995 to 1998/1999

Substance Used/Grade in School	Lifetime			Past Month		
	1995	1996	1998/1999	1995	1996	1998/1999
Alcohol						
6th	41	37	25	11	10	8
7th	60	59	36	24	25	15
8th	72	70	53	36	36	26
9th	78	77	63	45	44	35
10th	81	85	71	50	51	40
11th	83	86	80	53	52	48
12th	89	88	85	61	59	54
Marijuana						
6th	6	4	2	2	2	1
7th	13	15	7	7	9	3
8th	26	26	17	16	17	8
9th	40	38	31	28	21	18
10th	41	50	41	28	33	23
11th	46	50	51	29	31	28
12th	57	53	58	36	29	30
Inhalants						
6th	12	13	12	6	7	6
7th	22	23	14	11	12	6
8th	30	23	20	17	11	8
9th	22	22	17	7	8	6
10th	20	22	16	5	6	4
11th	18	15	14	5	4	3
12th	17	14	14	4	3	3
Cocaine						
6th	1	2	1	++	++	++
7th	3	4	2	2	1	++
8th	6	6	3	2	2	1
9th	5	5	5	2	2	2
10th	6	7	5	2	1	1
11th	5	4	6	1	1	2
12th	11	5	7	2	2	2
LSD or Other Psychedelics						
6th	2	1	1	1	++	++
7th	4	5	1	2	3	++
8th	9	8	4	4	4	2
9th	12	10	8	7	5	4
10th	10	16	9	5	6	4
11th	15	13	13	6	5	5
12th	23	15	16	7	5	5

(continued)

Exhibit 2.12 (continued)

Substance Used/Grade in School	Lifetime			Past Month		
	1995	1996	1998/1999	1995	1996	1998/1999
Cigarettes						
6th	24	22	14	6	6	3
7th	38	39	26	15	18	8
8th	54	51	40	24	24	14
9th	62	59	50	32	29	21
10th	65	68	57	32	37	25
11th	64	69	61	34	39	31
12th	73	68	68	41	33	36

Note 1: Data entries are percentages. Unweighted numbers of 1998/1999 respondents are shown in Table 1.1.

Note 2: Comparisons between 1998/1999 data and earlier years should be made cautiously given the changes in sampling procedures implemented in 1998/1999 (see Section 1.3.2).

++Less than 1%.

Source: Maine Youth Drug and Alcohol Survey: 1995, 1996, 1998/1999.

exhibited binge drinking behavior in the 2 weeks before the survey. Recent cigarette use was reported by 19% of students and recent marijuana use by 16%. Relatively large numbers of youths reported having ever used inhalants (over 15%).

There were few differences in substance use by gender or race/ethnicity. However, age and grade were important factors in prevalence of use. The rate of substance use increased steadily between grades 6 and 12 for all substances except inhalant use. For example, prevalence of recent alcohol use was 8% among 6th graders, 26% among 8th graders, 40% among 10th graders, and 54% among 12th graders. The only exception was inhalant use, where the highest rates of recent use were reported among 6th through 9th graders and the lowest rates among 10th through 12th graders.

Overall, students in Maine reported substance use prevalence rates that are similar to those reported in the Nation. The one notable exception is that both lifetime and past month marijuana use were substantially higher among Maine 12 th graders (58% and 30% respectively) than 12th graders in the nation as a whole (49% and 23%, respectively).

Assessing trends in substance use between 1995, 1996, and 1998/1999 is difficult given the differences in procedures used in 1998/1999 compared to 1995 and 1996: (a) the use of a volunteer school sample (1998/1999) rather than a random sample of schools (1995 and 1996) and (b) the use of active parental consent (1998/1999) rather than passive parental consent (1995 and 1996). Therefore, it is impossible to tell if changes in prevalence rates are due to procedural changes or to true

changes in substance use. With that said, the rates of use of most substances and for the lower grades were lower in 1998/1999 than in 1995 and 1996; rates of use among the higher grades (i.e., 11 and 12) remained relatively consistent.

Overall, the data presented in this chapter provide basic prevalence information about alcohol and other drug use for Maine students and offer insights into the groups most likely to experience substance use problems. However, it is important to note that because these data were collected from a school setting and youths problematically involved with substance use have often dropped out of school, data estimates for these latter drugs are likely to be somewhat conservative.

3. PREVALENCE OF VIOLENT AND PROHIBITED BEHAVIORS

This chapter presents data about violent and prohibited behaviors among Maine' s 6th to 12th grade student population. Violent behaviors include attacking others with the intent of seriously harming them and carrying a handgun. Prohibited behaviors include being drunk or high at school, suspended from school, stealing or attempting to steal a motor vehicle, selling illegal drugs, and being arrested. The prevalence of each of these behaviors is reported by grade and gender. We also report a composite scale for each category of behaviors and examine the frequency of these behaviors by grade and grade categories.

3.1 Violent Behavior

The national health agenda Healthy People 2000 identifies both physical fighting and weapon carrying among adolescents as target areas for improvement in the United States (Office of Disease Prevention and Health Promotion [ODPHP], 1999). Decreasing both fighting and weapon carrying is important because these are preventable causes of morbidity and mortality. Intentional injuries are a leading cause of death and injury in the United States, and firearms are involved in 70% of fatal intentional injuries (National Center for Health Statistics [NCHS], 1998, as reported in Hayes & Hemmenway, 1999; ODPHP, 1999).

Between 1991 and 1997, there was a decline of approximately 14% in fighting among high school students, and reports of injuries sustained as a result of physical fights declined 20% (Brener, Simon, Krug, & Lowry, 1999). Despite these declines, fighting was still reported by 37% of students in this study and at similar rates in other studies (Brener et al., 1999; Lowry, Powell, Kann, Collins, & Kolbe, 1998; Malek, Chang, & Davis, 1998a). In a survey of 7th grade students who had participated in a physical fight in the past 6 months, one or more weapons were reportedly used at 43% of the fights (Malek et al., 1998b). Another study showed that among those aged 12 to 21, 1 out of 30 had received medical care for fight-related injuries in the past 12 months (Lowry et al., 1998).

The rate of carrying a handgun also decreased between 1991 and 1997, from 7.9% to 5.9% (Brener et al., 1999). Many social and demographic characteristics have been associated with increased gun-carrying behavior:

> *male gender* (Arria, Wood, & Anthony, 1995; Bailey, Flewelling, & Rosenbaum, 1997; Hayes & Hemmenway, 1999; Sheley & Brewer, 1995),

alcohol use (Bailey et al., 1997; Hemenway, Prothrow-Stith, Bergstein, Ander, & Kennedy, 1996; Orpinas et al., 1995; Presley, Meilman, & Cashin, 1997),

drug use (Kingery, Pruitt, & Heuberger, 1996; Presley et al., 1997; Sheley, 1994; Sheley & Brewer, 1995),

increased number of sexual partners (Orpinas et al., 1995),

older age-within-class (Hayes & Hemmenway, 1999),

missing school out of concern for safety (Hayes & Hemmenway, 1999), and

gang membership (Hayes & Hemmenway, 1999).

Although respondents reported that weapon carrying confers a sense of safety, those who carry weapons are more likely to fight than others (Lowry et al., 1998; Malek et al., 1998a).

3.1.1 Prevalence of Attacking Others with the Idea of Seriously Hurting Them

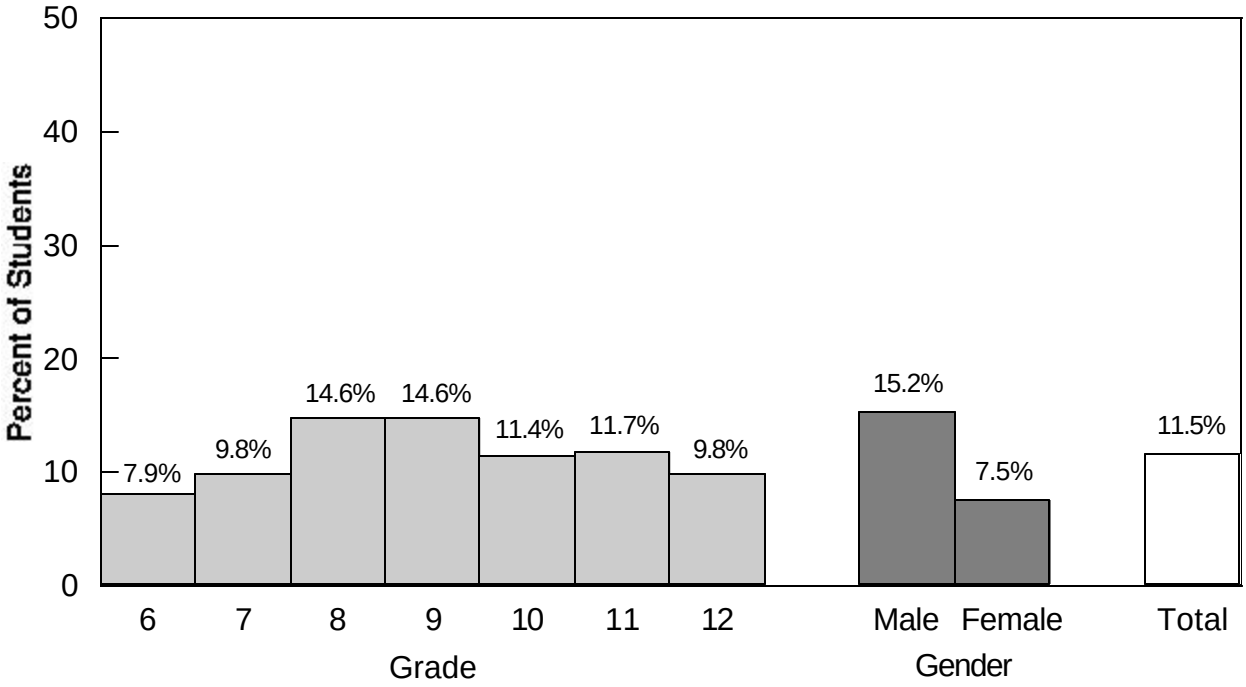
Exhibit 3.1 shows that more than 1 out of 10 Maine students (12%) had attacked others in the past year with the idea of seriously hurting them. This prevalence of attacking someone peaked in grades 8 and 9 (15%), and then decreased among students in the higher grades. Males were about twice as likely to report this behavior compared to females (15% and 8%, respectively).

3.1.2 Prevalence of Carrying a Handgun

Approximately 4% of Maine students reported carrying a handgun in the past year (Exhibit 3.2). It should be noted that carrying a handgun for the purpose of hunting is legal for Maine youths. The wording of this question did not allow delineation between legal and illegal gun carrying. Therefore, some of the students who reported carrying a handgun may have been doing so legally.

The prevalence of carrying a handgun in the past year varied little across grades. However, it did vary by gender. Approximately six times as many males (6%) as females (1%) reported carrying a handgun in the past year.

Exhibit 3.1 Prevalence of Attacking Others in the Past 12 Months with the Idea of Seriously Hurting Them Among the Maine Student Population in Grades 6-12, by Grade and Gender: 1998/1999



Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

3.1.3 Composite Scale for Violent Behavior

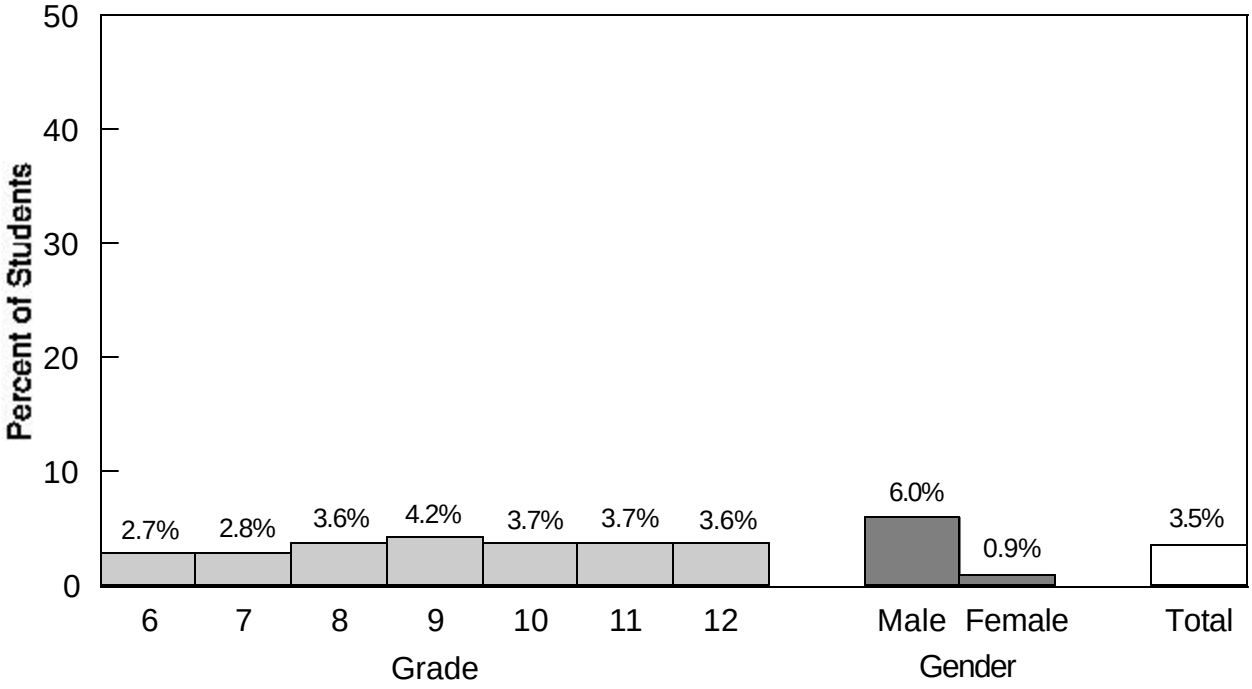
To examine the patterns of violent behavior, a violent behavior scale with three mutually exclusive categories was developed. Two variables were used to create this scale: attacking others with the intent of seriously harming them and carrying a handgun. Each of these questions asked students to report the number of times they had performed the behavior in the 12 months prior to the survey, and each question had eight response categories ranging from "never" to "40+ times." The three categories of the violent behavior composite scale were as follows:

none (student neither carried a handgun nor attacked someone in the past 12 months),

infrequent violent behavior (student reported one of the two behaviors "1 or 2 times"), and

frequent violent behavior (student reported both behaviors "1 or 2 times" *or* student reported one or both behaviors "3 or more times").

Exhibit 3.2 Prevalence of Carrying a Handgun in the Past 12 Months Among the Maine Student Population in Grades 6-12, by Grade and Gender: 1998/1999



Note: It should be noted that carrying a handgun for the purpose of hunting is legal for Maine youths. The wording of this question does not allow delineation between legal and illegal weapon carrying.

Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

Overall, approximately 87% of Maine' s students reported no violent behavior in the year prior to the survey, 7% reported infrequent violent behavior, and 6% reported frequent violent behavior (Exhibit 3.3). Frequent violent behavior was reported most often by 8 th and 9th grade students (7% each). Infrequent violent behavior was also reported most often by students in the 8 th and 9th grades (9% each). Grade categories were also compared. Frequent violent behavior was only slightly higher among the 9th through 12th grade category than the 6th through 8th grade category.

3.2 Prohibited Behavior

Delinquency is a serious problem in itself and also has been linked to several negative outcomes. Delinquent behavior (referred to as "prohibited behavior" in this report) has been associated with an increase in mortality that continues through the life span, although the causes of this increase in mortality are not well understood (Laub & Valliant, 2000). Delinquency in adolescence has been shown to predict signs of disturbance in young adulthood (Achenbach, Howell, McConaughy, & Stanger, 1998). One study showed that youths who reported high

Exhibit 3.3 Composite Scale: Violent Behavior Among the Maine Student Population in Grades 6-12, by Grade: 1998/1999

	Violent Behavior Scale		
Grade	**None[1]**	**Infrequent[2]**	**Frequent[3]**
Total Maine	86.8	7.4	5.9
Grade in School			
6th	90.2	5.5	4.2
7th	88.3	7.0	4.7
8th	83.6	9.3	7.1
9th	84.0	8.7	7.3
10th	86.8	6.7	6.4
11th	86.8	7.8	5.4
12th	88.6	5.8	5.5
Grade Categories			
6th - 8th	87.3	7.3	5.3
9th - 12th	86.4	7.3	6.2

Note: Data entries are percentages.

[1]No violent behavior (i.e., carrying a handgun or attacking someone) in the past 12 months.
[2]Engaged in one or two violent behaviors in the past 12 months.
[3]Engaged in three or more violent behaviors in the past 12 months.

Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

levels of delinquent behavior had more life stress, depression, and anxiety (and lower self-concept) than those who did not report delinquency (Weist, Paskewitz, Jackson, & Jones, 1998). In the same study, females but not males who were delinquent had poor classroom and school attendance compared to females who were not delinquent. Another study showed that delinquent adolescents are more likely to use alcohol and drugs, engage in risky sexual behaviors, have problems with family and peer relationships, and report more mental health symptoms (DuRant, Knight, & Goodman, 1997b).

Several studies have shown that a strong predictor of delinquency is the delinquency of one' s peers (Aseltine, 1995; Paetsch & Bertrand, 1997; Tolan & Thomas, 1995). Peer factors may be more important for males than females, in whom family factors may be more predictive of this behavior (Tolan & Thomas, 1995). Delinquency in childhood is associated with young adult drug use and delinquency through young adulthood (Brook, Whiteman, Finch, & Cohen, 1996). Onset of delinquency prior to age 12 has been associated with higher rates of delinquent

behavior, more serious acts, and a longer period of delinquency compared to onset at a later age (Tolan & Thomas, 1995).

One specific delinquent behavior, drug selling, has been associated with increased mortality; a review of the literature found that one third to one half of homicide deaths involved drug selling (Stanton & Galbraith, 1994). Drug selling was also associated with nonfatal violence, substance use, and incarceration.

3.2.1 Prevalence of Prohibited Behavior

Exhibit 3.4 shows the prevalence by grade of five prohibited behaviors: being drunk or high at school, suspended from school, stealing or attempting to steal a motor vehicle, selling illegal drugs, and having been arrested.

Drunk or High at School. Overall, 13% of Maine students reported having been drunk or high at school in the year prior to the survey. The prevalence of this behavior increased as grade increased; the range was less than 2% among 6th graders to 24% among 12th graders. Notably, more than 20% of Maine's 11th and 12th graders reported having been drunk or high at school in the 12 months prior to the survey.

Suspended from School. Overall, approximately 9% of Maine students reported having been suspended from school in the 12 months prior to the survey. The prevalence of having been suspended increased from 6th grade (4.1%) to the peak level of reporting in 9th grade (12%). Students in the 10th through 12th grades reported having been suspended at rates between 9% and 10%.

Stole or Tried to Steal a Motor Vehicle. Approximately 2% of the students reported that they either stole or tried to steal a motor vehicle in the past year. Estimates for grades 6, 7, and 12 were suppressed because of the small number of students reporting this behavior. Of the remaining grade levels, the highest rate of stealing or attempting to steal a motor vehicle was reported among 9th graders (4.1%).

Sold Illegal Drugs. Overall, 7% of Maine students reported that they sold illegal drugs in the year prior to the survey. The prevalence of this behavior increased as grade increased up to 11th grade; the range was 1.7% among 7th graders to 14% among 11th graders. Students in the 12th grade reported a slightly lower rate than 11th grade students. Notably, more than 10% of Maine's 10th, 11th, and 12th graders reported having sold illegal drugs in the 12 months prior to the survey.

Been Arrested. Overall, 4% of Maine students reported that they had been arrested in the year prior to the survey. The rate of having been arrested was highest among 9th, 11th, and 12th graders (6% each) and lowest among 6th and 7th graders (2% or less).

Exhibit 3.4 Prevalence of Prohibited Behavior in the Past Year Among the Maine Student Population in Grades 6-12: 1998/1999

	Grade							
Prohibited Behavior	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Total**
Drunk or High at School	1.8	4.3	8.9	16.1	19.4	21.9	24.2	13.4
Suspended from School	4.1	7.1	9.6	12.0	9.0	10.2	9.2	8.8
Stole or Tried to Steal a Motor Vehicle	++	++	2.6	4.1	3.3	3.4	++	2.4
Sold Illegal Drugs	++	1.7	3.8	9.1	11.5	13.7	12.0	7.3
Been Arrested	1.3	2.1	4.8	5.9	5.3	6.3	6.0	4.5

Note: Data entries are percentages. Unweighted numbers of respondents are shown in Table 1.1.

++Less than 1%.

Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

3.2.2 Composite Scale for Prohibited Behavior

Prohibited behavior included being drunk or high at school, suspended from school, stealing or trying to steal a motor vehicle, selling illegal drugs, and being arrested in the 12 months prior to the study. The questionnaire asked students to report the number of times they had performed each of these activities in the 12 months prior to the survey, with eight response categories ranging from "never" to "40+ times." A prohibited behavior composite scale was created using their responses to these questions:

> none was defined as no prohibited behavior in the past 12 months,
>
> infrequent was defined as performing any of these behaviors "1 or 2 times," and
>
> frequent was defined as reporting any behavior more often than "1 or 2 times" or reporting two or more behaviors "1 or 2 times."

As displayed in Exhibit 3.5, approximately 80% of Maine students reported no prohibited behavior in the year prior to the survey, 8% reported infrequent prohibited behavior, and 13% reported frequent prohibited behavior. Frequency of prohibited behavior increased with increasing grade. About 3% of 6th graders to 20% of 12th graders reported frequent prohibited behavior, with frequent prohibited behavior almost doubling between grades 6 and 7, 7 and 8, and 8 and 9. Grade categories were also examined. Frequent prohibited behavior was reported by three times as many older students (6% of younger vs. 18% of older students).

3.3 Summary

Overall, the data presented in this chapter provide prevalence information about violent and prohibited behavior among Maine students and the grade level of students most likely to perform these behaviors. As in Chapter 2, it is important to note that because these data were collected from a school setting and violent or delinquent youths may be more likely to have dropped out of school, data estimates for these behaviors may be somewhat conservative.

Violent behavior included attacking others in the 12 months prior to the survey with the intent to seriously hurt them and carrying a handgun. Over 10% Maine students reported attacking someone. About twice as many males as females reported this behavior. Attacking someone peaked in the middle grades of 8 and 9. About 4% of Maine school-aged youths had carried a handgun in the year prior to the study. Again, males were much more likely to report this behavior than females. This behavior peaked in 9th grade, but the prevalence was between 3% and 4% for all grades. The composite scale showed that about 87% of students reported no

Exhibit 3.5 Composite Scale: Prohibited Behavior Among the Maine Student Population in Grades 6-12, by Grade: 1998/1999

	Prohibited Behavior Scale		
Grade	**None[1]**	**Infrequent[2]**	**Frequent[3]**
Total Maine	79.5	8.0	12.5
Grade in School			
6th	93.5	4.0	2.5
7th	88.6	6.5	4.8
8th	82.0	8.8	9.2
9th	75.0	9.1	15.9
10th	74.7	8.3	17.0
11th	71.1	9.2	19.7
12th	69.6	10.2	20.2
Grade Categories			
6th - 8th	88.0	6.5	5.6
9th - 12th	72.8	9.2	18.1

Note: Data entries are percentages.

[1]No prohibited behavior (i.e., drunk or high at school, suspended from school, stole or tried to steal a motor vehicle, sold illegal drugs, been arrested) in the past 12 months.
[2]Engaged in one or two prohibited behaviors in the past 12 months.
[3]Engaged in three or more prohibited behaviors in the past 12 months.

Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

violent behavior, 7% infrequent, and 6% frequent violent behavior. These behaviors seemed to increase to their highest levels in the middle grades of 8 and 9, with fewer younger and older students reporting these violent behaviors.

Prohibited behaviors included on the survey were being drunk or high at school, suspended from school, stealing or trying to steal a motor vehicle, selling illegal drugs, and having been arrested. Of these, the most common was being drunk or high at school (13%), followed by suspended from schools (9%) and selling illegal drugs (7%). Reports of being arrested (4.5%) and stealing or trying to steal a motor vehicle (2.4%) were lower. The composite scale showed that prohibited behaviors generally increased with increasing grade. In fact, three times the number of 9 th through 12th grade students reported frequent prohibited behaviors compared to 6th through 8th grade students (18% vs. 6%).

4. RISK AND PROTECTIVE FACTORS FOR ADOLESCENT HEALTH BEHAVIORS

Social research has identified numerous and interrelated factors that increase or decrease the probability of alcohol, tobacco, and other drug use and related problems among youths. These risk and protective factors are found at multiple levels, including the individual, the family, the peer group, the school, and the community (Hawkins et al., 1992; Kandel et al., 1986; Newcomb & Felix-Ortiz, 1992). Identification of specific populations in which risk factors are high and protective factors are low permits identification of prevention needs and facilitates targeting programming toward the reduction of risk factors and the enhancement of protective factors (Hawkins et al., 1997). For a more complete description of the literature on adolescent risk and protective factors, see Section 1.2.

In this chapter, we present data on risk and protective factors for adolescent health behaviors among Maine students. Where possible, scale construction followed guidelines provided by the University of Washington's Social Development Research Group (SDRG) staff. [1] Risk and protective factor scales were constructed using Likert scaling practices. The response options of some items were recoded or reordered to provide a continuum from high to low appropriate for the scale. For risk scale items, a high value reflects an undesirable attitude or behavior. For protective scale items, a high value reflects a desirable attitude or behavior. Missing data were handled by computing the average response to those items on the scale to which the student responded. A scale score was computed only if a student responded to a minimum of two thirds of the items on that scale. Valid (i.e., nonmissing) data were generally available for between 80% to 95% of all respondents (see Appendix A exhibits).

The first four sections of this chapter focus on four risk and protective factor domains (i.e., community, school, family, and peer-individual). Each section's data are presented in two tables, the first displaying the percentage of students considered at risk or resilient on each scale. Each risk and protective factor scale is calculated as the average of responses to questions in that scale, or the response if the scale included only one item. Students whose scores placed them above the numerical midpoint of the scale were considered "at risk" on a given risk factor or "resilient" on a given protective factor. For example, "low neighborhood attachment" is based on the average response to three statements ("I like my neighborhood," "If I had to move, I would miss the neighborhood I now live in,"

[1]The exceptions include the community risk factor "transitions and mobility," the community factor "opportunities for conventional involvement," the school factor "little commitment to school," the family factor "history of antisocial behavior," and the peer-individual factor "early initiation of problem behavior." For each of these scales (except family history of antisocial behavior), factor analysis revealed that for Maine, the items loaded into two factors rather than one factor. In Maine, one item in SDRG's family history of antisocial behavior scale (weapon carrying) did not load highly on the scale and was therefore dropped.

and "I' d like to get out of my neighborhood"), and each of these questions was answered on a scale of 0 to 3. Thus, a student who scored above 1.5 (i.e., the midpoint) on this scale was considered "at risk."

The second table in each section displays the relationship between the risk and protective factors and the measures of health risk behaviors (i.e., alcohol use, other drug use, violent behavior, and prohibited behavior) using logistical regression. All variables are entered into the models as dichotomous variables (i.e., yes/no). The health risk behavior scales were dichotomized to indicate whether a youth reported recent substance use (i.e., in the past month) and violent and prohibited behaviors (i.e., in the past year). The risk and protective factor scales were dichotomized into whether a youth was above or below the midpoint of the scale.

The statistic produced from logistic regression analysis is an odds ratio (OR), which reflects the likelihood of a positive response relative to that for a defined reference group. ORs greater than 1.0 indicate an increased likelihood relative to the reference group, and ORs of less than 1.0 indicate a decreased likelihood. For example, the OR for the relationship between community disorganization and alcohol use in the past month was 2.1. This indicates that students who were at risk on the factor of community disorganization were twice as likely to indicate past month alcohol use than students who were not at risk on this factor. Because all analyses are based on cross-sectional correlations, however, it is important to bear in mind that causal linkages between the health risk behaviors and the risk and protective factors cannot be established and should not be inferred. In other words, it cannot be determined if students use substances because they perceive them as being available, or if they perceive substances as available because they use them.

In addition, research has shown that the greater the number of risk factors present, the greater the risk of drug abuse (e.g., Bergeson, Kelly, Fitch, & Mueller, 1998; Bry, McKeon, & Pandina, 1982; Newcomb, Maddahian, Skager, & Bentler, 1987; Werner & Smith, 1992). The opposite is true for protective factors; the greater the number of protective factors, the lower the risk of drug abuse. Therefore, in Section 4.5, we display the number of risk and protective factors by the use of alcohol and other substances. Section 4.6 summarizes the important findings from this chapter.

4.1 Community Factors

The survey assessed six risk factors and three protective factors in the community domain:

> **Low neighborhood attachment** (Items 86, 88, 98)—This scale describes the extent to which students feel a part of their neighborhood (whether they feel that what they do makes a difference).

Community disorganization (Items 90[a-d], 96)—This scale describes students' perceptions of the extent to which people in the community take part in decisions or processes that affect their lives.

Personal transitions and mobility (Items 92, 95, 97, 99)—This scale describes the extent to which students have changed homes or schools.

Community transitions and mobility (Item 91)—This scale describes the extent to which students feel that people move in and out of their neighborhood.

Laws and norms favorable toward drug use (Items 77, 79, 81, 84[a-c], 85[a-d])—This scale describes students' perceptions of community policies regarding substance use and other problem behaviors.

Perceived availability of drugs and handguns (Items 75, 76, 78, 80, 82)—This scale describes students' perception of availability or access to alcohol, drugs, or firearms.

Opportunities for conventional involvement (Items 94[a-e])—This scale describes students' perceptions of the extent of opportunities to participate in community activities.

Opportunities for positive interaction (Item 89)—This scale describes students' perceptions of the extent to which adults in their neighborhood are available for interaction.

Rewards for conventional involvement (Items 87, 93, 100)—This scale describes students' perceptions of the extent of rewards for positive participation in community activities.

In general, the community scales were very reliable, with internal consistency reliabilities (coefficient alpha) generally reaching 0.70 or higher (see Exhibit A.1 in Appendix A). All of them reached 0.70 or higher except one protective factor, which was 0.67.

Exhibit 4.1 displays the percentage of students "at risk" and "resilient" on each of the community scales. This exhibit shows, for example, that 20% of Maine students' scale scores for "low neighborhood attachment" were above the midpoint of the scale. Thus, we would consider 20% of Maine's students at risk on this factor.

Exhibit 4.1 Profile of Community Risk and Protective Factors Among the Maine Student Population in Grades 6-12, by Grade: 1998/1999

	Grade							
Community Factor	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Total**
Risk Factors								
Low neighborhood attachment	11.9	14.2	18.9	22.7	23.7	23.4	25.1	20.0
Community disorganization	4.7	6.1	7.1	7.4	6.0	5.7	4.2	6.0
Personal transitions and mobility	11.1	10.8	9.8	15.1	10.6	9.6	10.6	11.2
Community transitions and mobility	10.0	11.2	12.1	15.4	14.6	14.5	16.6	13.5
Laws and norms favorable toward drug use	4.3	8.1	15.4	22.9	29.9	35.6	41.2	22.3
Perceived availability of drugs and handguns	7.4	16.3	33.1	53.5	65.9	70.9	79.9	46.4
Protective Factors								
Opportunities for conventional involvement	69.9	69.4	66.9	69.9	69.9	69.5	69.5	69.2
Opportunities for positive interaction	61.2	52.6	44.5	37.5	33.7	35.6	30.7	42.2
Rewards for conventional involvement	57.4	49.9	45.4	42.0	40.7	41.8	38.9	45.1

Note: Each risk and protective factor scale was calculated as the average of one or more questions. Students whose scores placed them above the midpoint of the scale were considered "at risk" or "resilient" for a given factor. Figures in this table indicate the percentage "at risk" or "resilient."

Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

Exhibit 4.1 shows that the most important community risk factor for Maine students at the time of the survey was "perceived availability of drugs and handguns"; nearly half of all students were at risk on this factor. This exhibit also shows that as students got older, they were at increasing risk on the factors of "low neighborhood attachment," "laws and norms favorable toward substance use," and "perceived availability of drugs and handguns."

The other significant finding is that as age increased, fewer students were resilient on the factor of "rewards for conventional involvement" and "opportunities for positive interaction." Resiliency rates on the factor of "opportunities for conventional involvement" were fairly consistent across grades.

All community risk factors were shown to be positively related to the health behavior scales; that is, youths who were at risk on the risk factor scales (i.e., above the midpoint) were more likely to have used substances in the past month and have participated in violent or prohibited behaviors in the past year (Exhibit 4.2). The strongest relationships between substance use and risk behaviors were for the risk factors of "perceived availability of drugs and handguns" and "laws and norms favorable toward drug use." Youths who were at risk on each of these factors were six to eight times more likely to have used alcohol or other drugs in the past month than students who were not at risk on these factors. These same risk factors also showed the strongest relationship with prohibited behavior in the past year. Violent behavior in the past year was most strongly related to "laws and norms favorable toward substance use" and "community disorganization."

Similarly, all community protective factors were shown to be positively related to the health behavior scales; that is, youths who were resilient on the protective factor scales (i.e., above the midpoint) were more likely *not* to have used substances in the past month and participated in violent or prohibited behaviors in the past year than students who were not resilient (Exhibit 4.2).

4.2 School Factors

The survey assessed three risk factors and two protective factors in the school domain:

> **Academic failure** (Items 13, 24)—This scale describes students' academic achievement (i.e., grades in school, perception of their own grades compared to those of others).
>
> **Little commitment to school** (Items 26, 27, 28, 29[a-c])—This scale describes the extent to which students felt that school was important and meaningful.

Exhibit 4.2 Odds Ratios of Community Risk and Protective Factors with Health Behaviors Among the Maine Student Population in Grades 6-12: 1998/1999

Community Factor	Health Behavior			
	Alcohol Use[1]	Other Drug Use[1]	Violent Behavior[2]	Prohibited Behavior[3]
Risk Factors				
Low neighborhood attachment	1.7	2.1	2.1	2.2
Community disorganization	2.1	3.0	4.2	3.3
Personal transitions and mobility	1.4	1.8	2.1	2.3
Community transitions and mobility	1.6	1.9	2.0	2.2
Laws and norms favorable toward drug use	5.8	8.2	4.6	8.2
Perceived availability of drugs and handguns	6.7	8.1	3.3	6.4
Protective Factors				
Opportunities for conventional involvement	1.2	1.4	1.7	1.5
Opportunities for positive interaction	1.9	2.0	1.5	1.9
Rewards for conventional involvement	1.9	2.3	2.1	2.3

[1]Refers to use during the month prior to the survey.
[2]Refers to carrying a handgun or attacking others with the intention of hurting them in the past 12 months.
[3]Refers to getting drunk or high at school, getting suspended from school, stealing or trying to steal a motor vehicle, selling illegal drugs, or being arrested in the past 12 months.

Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

School absenteeism (Items 14[a-c])—This scale describes the extent to which students reported being absent from school.

Opportunities for positive involvement (Items 15, 16, 18, 19, 25)—This scale describes students' perceptions of the extent to which they had opportunities to participate in school activities.

Rewards for conventional involvement (Items 17, 21, 22, 23)—This scale describes students' perceptions of the extent to which they were rewarded for positive participation in school activities.

In general, the school scales were fairly reliable, with internal consistency reliabilities (coefficient alpha) ranging from 0.56 to 0.82 (see Exhibit A.2 in Appendix A).

Exhibit 4.3 displays the percentage of students "at risk" and "resilient" on each of the school scales. This exhibit shows that as Maine students got older, they were generally at

Exhibit 4.3 Profile of School Risk and Protective Factors Among the Maine Student Population in Grades 6-12, by Grade: 1998/1999

	Grade							
School Factor	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Total**
Risk Factors								
Academic failure	14.8	18.4	20.1	24.4	23.9	22.7	25.7	21.5
Little commitment to school	11.3	17.3	24.2	26.2	30.2	28.9	32.8	24.2
School absenteeism	++	1.3	1.7	1.9	++	2.4	2.9	1.8
Protective Factors								
Opportunities for positive involvement	87.3	85.6	84.6	82.6	81.6	79.6	81.0	83.3
Rewards for conventional involvement	75.3	65.4	59.4	54.0	53.7	52.7	57.0	59.8

Note: Each risk and protective factor scale was calculated as the average of one or more questions. Students whose scores placed them above the midpoint of the scale were considered "at risk" or "resilient" for a given factor. Figures in this table indicate the percentage "at risk" or "resilient."

++Less than 1%.

Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

increasing risk on the factor of "little commitment to school," from 11% of 6th graders to 33% of 12th graders. Students in grades 9 through 12 were also at greater risk than younger students on the factor of "academic failure."

Generally as age increased, fewer students were resilient on the factors of "opportunities for positive involvement" and "rewards for conventional involvement." The percentage resilient on both factors was highest among 6th graders and lowest among 11th graders. The percentages were slightly higher among 12th graders than 11th graders; this increase might be related to less resilient individuals dropping out of school.

All school risk factors were shown to be positively related to the health behavior scales (Exhibit 4.4). Youths who were at risk on each of these factors were two to five times more likely to have used alcohol or other drugs in the past month, and four to seven times more likely to report violent or prohibited behaviors, than students who were not at risk. Similarly, all school protective factors were shown to be positively related to the health behavior scales. Youths who were resilient on each of these protective factors were two to three times more likely *not* to have used substances or to report violent or prohibited behaviors than students who were not resilient.

4.3 Family Factors

The survey assessed six risk factors and three protective factors in the family domain:

Poor family management (Items 105, 108, 110, 112, 127, 129)—This scale describes students' perceptions of the extent of parental oversight and rule-making.

Poor Discipline (Items 111, 113, 114)—This scale describes students' perceptions of whether they would be caught by parents if they behaved inappropriately.

Conflict (Items 107, 109, 128)—This scale describes students' perceptions of conflict within the family.

History of antisocial behavior (Items 104[a-c, e][2], 106)—This scale describes students' perceptions of substance use and antisocial behavior among siblings and other family members.

[2]Item 104d was deleted from the original scale based on factor analysis.

Exhibit 4.4 Odds Ratios of School Risk and Protective Factors with Health Behaviors Among the Maine Student Population in Grades 6-12: 1998/1999

School Factor	Health Behavior			
	Alcohol Use[1]	Other Drug Use[1]	Violent Behavior[2]	Prohibited Behavior[3]
Risk Factors				
Academic failure	2.4	3.4	3.7	4.4
Little commitment to school	5.1	4.1	3.9	4.9
School absenteeism	3.8	5.1	5.4	6.6
Protective Factors				
Opportunities for positive involvement	1.9	2.3	2.8	2.8
Rewards for conventional involvement	2.0	2.3	2.4	2.5

[1]Refers to use during the month prior to the survey.

[2]Refers to carrying a handgun or attacking others with the intention of hurting them in the past 12 months.

[3]Refers to getting drunk or high at school, getting suspended from school, stealing or trying to steal a motor vehicle, selling illegal drugs, or being arrested in the past 12 months.

Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

Parental attitudes favorable toward drug use (Items 103[a-c])—This scale describes students' perceptions of the extent to which parents approve of their children's substance use.

Parental attitudes favorable toward antisocial behavior (Items 103[d-f])—This scale describes students' perceptions of the extent to which parents approve of their children's antisocial behaviors.

Attachment (Items 116, 117, 121, 122, 123, 125)—This scale describes the level of students' attachment and communication with their parents.

Opportunities for positive involvement (Items 119, 124, 126)—This scale describes students' perceptions of the extent to which they have opportunities to participate in family activities.

Rewards for conventional involvement (Items 115, 120)—This scale describes students' perceptions of the extent to which they are rewarded by their family for positive activities.

In general, the family scales were very reliable, with internal consistency reliabilities (coefficient alpha) ranging from 0.70 to 0.87 (see Exhibit A.3 in Appendix A).

Exhibit 4.5 displays the percentage of students "at risk" and "resilient" on each of the family scales. The most common family risk factors for Maine students were "history of antisocial behavior," "conflict," and "poor discipline"; approximately one third of all students were at risk on each of these factors. The exhibit also shows that as students got older, they were at increasing risk on the factors of "poor family management," "poor discipline," "history of antisocial behavior," and "parental attitudes favorable toward substance use." For example, only 10% of 6th graders were at risk on the factor of "poor discipline" compared to 51% of 12th graders. Students in grade 10 were at greater risk than students in lower and higher grades on the "conflict" factor, and students in grade 9 were at greatest risk on the factor of "parental attitudes favorable toward antisocial behavior."

Another significant finding is that, in general, as age increased, fewer students were resilient on each of the protective factors. For example, 82% of 6th graders, 70% of 8th graders, 62% of 10th graders, and 59% of 12th graders were resilient on the "rewards for conventional involvement" factor.

All family risk factors were shown to be positively related to the health behavior scales (Exhibit 4.6). The strongest relationships between substance use and risk behaviors were for the risk factor of "parental attitudes favorable toward drug use." Youths who were at risk on this factor were 7 times more likely to have used alcohol in the past month and 11 times more likely to have used other drugs in the past month than students who were not at risk on this factor. For all other risk factors, at-risk youths were two to six times more likely to report substance use than youths not at risk. The risk factor of "parental attitudes favorable toward antisocial behavior" showed the strongest relationship with violent and prohibited behaviors in the past year. The parental attitude variables also showed the strongest relationships with prohibited behaviors.

Similarly, all protective factors were shown to be positively related to the health behavior scales (Exhibit 4.6). Youths who were resilient on each of these protective factors were two to three times more likely *not* to have used substances or to report violent or prohibited behaviors than students who were not resilient.

4.4 Peer-Individual Factors

The survey assessed 13 risk factors and 2 protective factors in the peer-individual domain:

> **Rebelliousness** (Items 33, 36, 48)—This scale describes the extent of rebelliousness (e.g., ignoring rules).

Exhibit 4.5 Profile of Family Risk and Protective Factors Among the Maine Student Population in Grades 6-12, by Grade: 1998/1999

	Grade							
Family Factor	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Total**
Risk Factors								
Poor family management	3.3	4.6	5.9	6.1	6.2	8.0	11.9	6.6
Poor discipline	9.5	14.6	22.1	30.2	35.8	41.6	50.5	29.4
Conflict	20.4	24.8	29.7	33.6	36.5	31.8	32.8	30.2
History of antisocial behavior	9.8	19.1	27.9	37.2	43.5	48.4	53.9	34.5
Parental attitudes favorable toward drug use	++	1.5	3.0	5.5	6.6	9.2	14.7	5.6
Parental attitudes favorable to antisocial behavior	2.3	3.4	4.8	5.6	3.9	3.2	4.1	4.0
Protective Factors								
Attachment	90.3	83.8	76.7	73.0	69.9	71.0	70.6	76.1
Opportunities for positive involvement	88.5	82.5	77.7	75.5	72.9	72.2	72.7	77.1
Rewards for conventional involvement	81.8	75.9	69.9	66.5	61.9	60.5	59.3	67.6

Note: Each risk and protective factor scale was calculated as the average of one or more questions. Students whose scores placed them above the midpoint of the scale were considered "at risk" or "resilient" for a given factor. Figures in this table indicate the percentage "at risk" or "resilient."

++Less than 1%.

Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

Exhibit 4.6 Odds Ratios of Family Risk and Protective Factors with Health Behaviors Among the Maine Student Population in Grades 6-12: 1998/1999

Family Factor	Health Behavior			
	Alcohol Use[1]	Other Drug Use[1]	Violent Behavior[2]	Prohibited Behavior[3]
Risk Factors				
Poor family management	3.1	4.0	4.1	4.7
Poor discipline	4.2	4.7	3.2	4.8
Conflict	1.8	2.0	2.5	2.1
History of antisocial behavior	4.1	4.7	2.5	4.2
Parental attitudes favorable toward drug use	7.4	10.6	4.5	8.8
Parental attitudes favorable to antisocial behavior	4.1	5.8	8.0	7.8
Protective Factors				
Attachment	2.2	2.6	2.1	2.5
Opportunities for positive involvement	2.1	2.5	2.5	2.4
Rewards for conventional involvement	2.2	2.6	2.5	2.6

[1]Refers to use during the month prior to the survey.
[2]Refers to carrying a handgun or attacking others with the intention of hurting them in the past 12 months.
[3]Refers to getting drunk or high at school, getting suspended from school, stealing or trying to steal a motor vehicle, selling illegal drugs, or being arrested in the past 12 months.

Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

Early initiation of substance use (Items 31[a-d])—This scale describes the extent to which students began using substances at an early age.

Early initiation of problem behavior (Items 31[e-i])—This scale describes the extent to which students began participating in problem behaviors at an early age.

Impulsiveness (Items 49, 50, 51, 52)—This scale describes the extent of impulsiveness (e.g., not thinking before acting, switching from one activity to another).

Antisocial behavior (Items 41[a-h])—This scale describes the extent to which students have been involved in antisocial behaviors, such as being suspended from school, stealing, or fighting.

Attitudes favorable toward antisocial behavior (Items 32[a-e])—This scale describes the extent to which students believed that participating in antisocial behaviors was acceptable.

Attitudes favorable toward drug use (Items 32[f-i])—This scale describes the extent to which students believed that using substances was acceptable.

Perceived risks of drug use (Items 53[a-d])—This scale describes students' perceptions of the risks associated with substance use.

Interaction with antisocial peers (Items 30[e-k])—This scale describes students' perceptions of the extent to which their friends participated in antisocial behaviors.

Friends' use of drugs (Items 30[a-d])—This scale describes students' perceptions of the extent to which their friends used alcohol or drugs.

Sensation seeking (Items 38[a-c])—This scale describes the extent to which students did things on a dare or did things that were dangerous.

Rewards for antisocial involvement (Items 42[a-d])—This scale describes students' perceptions of the extent to which they were rewarded by their peers for participating in antisocial behaviors.

Social skills (Items 43, 44, 45, 46)—This scale describes the extent to which students displayed social skills (e.g., being able to say "no" to friends, listening to parents).

Belief in the moral order (Items 34, 35, 37, 47)—This scale describes the extent to which students believed in moral order (e.g., telling the truth even if it got them in trouble, thinking that cheating is OK).

In general, the peer-individual scales were very reliable, with internal consistency reliabilities (coefficient alpha) generally ranging from 0.74 to 0.85 (see Exhibit A.4 in Appendix A). The only exceptions were social skills and the newly created scale "early initiation of antisocial behaviors," which were both below 0.70.

Exhibit 4.7 displays the percentage of students "at risk" and "resilient" on each of the peer-individual scales. This exhibit shows that the most important peer-individual risk factors for Maine students were "friends' substance use," "sensation seeking," and "rebelliousness"; nearly one quarter of all students were at risk on each of these factors. The exhibit also shows that as students got older, they were at increasing risk on the factors of "rebelliousness," "attitudes favorable toward substance use," "perceived risks of substance use," "friends' substance use," and "sensation seeking."

Exhibit 4.7 Profile of Peer-Individual Risk and Protective Factors Among the Maine Student Population in Grades 6-12, by Grade: 1998/1999

Peer-Individual Factor	Grade 6	7	8	9	10	11	12	Total
Risk Factors								
Rebelliousness	10.1	15.2	22.1	26.1	23.9	25.9	24.3	21.0
Early initiation of substance use	2.8	7.4	15.5	22.6	22.4	21.0	20.1	15.8
Early initiation of antisocial behaviors	1.3	1.7	2.3	2.6	+	+	+	1.7
Impulsiveness	8.6	11.3	14.2	12.6	11.2	10.8	9.6	11.3
Antisocial behavior	+	+	+	+	+	+	+	+
Attitudes favorable toward antisocial behavior	2.9	5.3	10.0	13.3	11.1	11.0	9.9	9.1
Attitudes favorable toward substance use	1.5	4.0	9.6	18.6	23.1	27.1	32.7	16.0
Perceived risks of substance use	8.7	9.7	14.8	19.6	20.8	22.3	22.2	16.8
Interaction with antisocial peers	++	++	1.9	3.4	2.3	2.1	2.4	2.0
Friends' substance use	1.5	5.9	14.6	27.3	36.2	40.1	47.5	24.0
Sensation seeking	10.7	15.7	23.6	27.8	28.7	30.8	31.9	23.9
Rewards for antisocial involvement	5.4	7.9	11.6	12.7	11.9	10.4	9.1	9.9
Gang involvement	5.6	6.6	7.6	6.2	3.7	4.8	3.5	5.5
Protective Factors								
Social skills	89.4	81.5	69.7	63.9	61.8	62.2	59.6	69.9
Belief in the moral order	91.8	83.5	71.3	65.1	67.2	67.6	67.4	73.5

Note: Each risk and protective factor scale was calculated as the average of one or more questions. Students whose scores placed them above the midpoint of the scale were considered "at risk" or "resilient" for a given factor. Figures in this table indicate the percentage "at risk" or "resilient."

+Unreliable estimate.

++Less than 1%.

Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

The other significant finding is that, in general, as age increased, fewer students were resilient on each of the protective factors. For example, 92% of 6th graders, 71% of 8th graders, and 67% of 10th through 12th graders were resilient on the "belief in the moral order" factor.

All peer-individual risk factors were shown to be positively related to the health behavior scales (Exhibit 4.8). The strongest relationships between substance use and risk behaviors were for the risk factors of "early initiation of substance use," "attitudes favorable toward substance use," "friends' substance use," and "antisocial behaviors." Youths who were at risk on each of these factors were 6 to 17 times more likely to have used alcohol or other drugs in the past month than students who were not at risk on these factors. The risk factors that showed the strongest relationships with violent and prohibited behaviors in the past year were "early initiation of antisocial behaviors" and "interaction with antisocial peers."

Similarly, both peer-individual protective factors were shown to be positively related to the health behavior scales (Exhibit 4.8). Youths who were resilient on these factors were 5 to 10 times more likely *not* to report substance use or violent or prohibited behaviors than students who were not resilient.

4.5 Effect of the Number of Risk and Protective Factors

The results presented so far in this chapter have dealt with risk and protective factors on an individual basis. However, research also suggests that there is a cumulative effect in the influence of risk on protection and health risk behaviors (Bergeson et al., 1998; Bry et al., 1982; Newcomb et al., 1987; Werner & Smith, 1992). That is, in addition to the specific influence of a given risk or protective factor, it is important to examine the relationship between multiple risk or protective factors and these behaviors.

To assess this relationship, we created measures to indicate the number of risk factors reported by each student as well as the number of protective factors. The cumulative measures were created by simply counting the number of risk factor scales on which students were above the midpoint, and the number of protective factor scales on which students were above the midpoint. The possible number of risk factors ranged from 0 to 27, and the possible number of protective factors ranged from 0 to 10. However, because few youths reported 13 or more risk factors, this category was collapsed with those reporting 12 risk factors.

Overall, about 23% of Maine students reported none of the risk factors asked about in this survey. Approximately 30% reported 1 or 2 risk factors, 24% reported 3 to 5 risk factors, 17% reported 6 to 10 risk factors, and 11% reported more than 10 risk factors.

Exhibit 4.8 Odds Ratios of Peer-Individual Risk and Protective Factors with Health Behaviors Among the Maine Student Population in Grades 6-12: 1998/1999

Peer-Individual Factor	Health Behavior			
	Alcohol Use[1]	Other Drug Use[1]	Violent Behavior[2]	Prohibited Behavior[3]
Risk Factors				
Rebelliousness	3.6	4.5	5.7	5.7
Early initiation of substance use	11.8	14.8	5.8	14.6
Early initiation of antisocial behaviors	4.1	8.6	40.2	27.4
Impulsiveness	2.4	3.2	4.2	3.7
Antisocial behavior	6.2	16.8	NA	NA
Attitudes favorable toward antisocial behavior	5.7	7.8	11.6	10.7
Attitudes favorable toward substance use	11.3	16.0	4.7	13.7
Perceived risks of substance use	5.0	8.4	4.1	7.2
Interaction with antisocial peers	4.8	10.6	17.8	20.3
Friends' substance use	10.2	16.2	3.7	11.7
Sensation seeking	5.6	6.6	6.7	7.3
Rewards for antisocial involvement	2.1	2.6	2.7	2.5
Gang involvement	3.1	5.0	10.3	7.3
Protective Factors				
Social skills	7.2	8.8	6.0	9.3
Belief in the moral order	5.0	5.9	5.8	6.4

NA: Not applicable because of overlapping questions on the antisocial behavior scale and the violent and prohibited behavior scales.

[1]Refers to use during the month prior to the survey.

[2]Refers to carrying a handgun or attacking others with the intention of hurting them in the past 12 months.

[3]Refers to getting drunk or high at school, getting suspended from school, stealing or trying to steal a motor vehicle, selling illegal drugs, or being arrested in the past 12 months.

Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

Analyses to assess the cumulative effects of risk factors on four types of past month substance use (i.e., alcohol use, marijuana use, any other drug use, and tobacco use) clearly show that the greater the number of risk factors, the more likely youths were to report substance use (Exhibit 4.9). For example, although only 4% of the youths with no risk factors reported use of alcohol, 18% of those with 2 risk factors, 35% of those with 4 risk factors, 49% of those with 6 risk factors, 60% of those with 8 risk factors, 72% of those with 10 risk factors, and 84% of those with 12 or more risk factors reported such use.

Overall, 9% of Maine students reported all 10 of the protective factors asked about in this survey. Approximately 13% reported nine protective factors, 14% reported eight protective factors, 14% reported seven protective factors, 12% reported six protective factors, 10% reported five protective factors, 10% reported four protective factors, 8% reported three protective factors, 6% reported two protective factors, and 5% reported only one or no protective factors.

Analyses to assess the cumulative effects of protective factors on substance use show that the greater the number of protective factors, the less likely youths were to report substance use (Exhibit 4.10). For example, only 13% of the youths with 10 protective factors reported use of alcohol, 23% of those with 7 or 8 protective factors, 39% of those with 4 or 5 protective factors, 54% of those with 2 protective factors, and 69% of those with no protective factors reported such use.

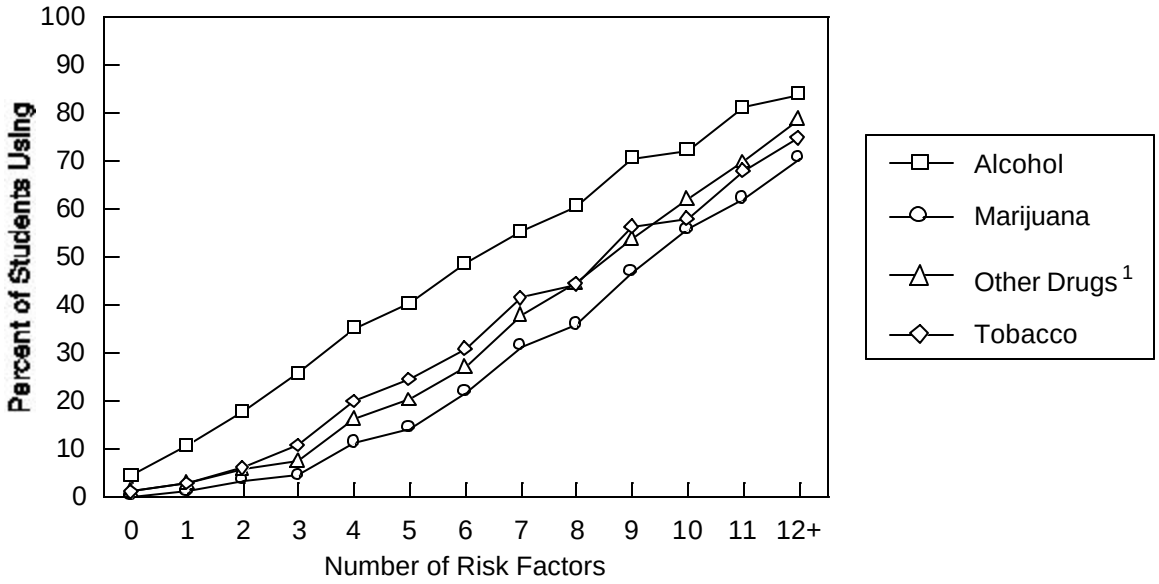
4.6 Summary

In general, as students got older, they were at increased risk on the various risk factors and were less resilient on the protective factors. For example, only 7% of 6th graders were at risk on the factor of "perceived availability of drugs and handguns" compared with 33% of 8th graders, 66% of 10th graders, and 80% of 12th graders.

Nearly half of all students in Maine were at risk on the factor of "perceived availability of drugs and handguns," and over one quarter were at risk on the factors of "poor family discipline," "family conflict," and "family history of antisocial behavior." Less than half of all students in Maine were resilient on the protective factors of "community opportunities for positive interaction" and "community rewards for conventional involvement."

All risk factors within each domain were shown to be positively related to health behaviors. Some of the strongest relationships between health behaviors were for the peer-individual risk factors of "early initiation of substance use," "attitudes favorable toward drug use," "friends' substance use," and "antisocial behavior." Youths who were at risk on each of these factors were 10 to 17 times more likely to have used alcohol or other drugs in the past

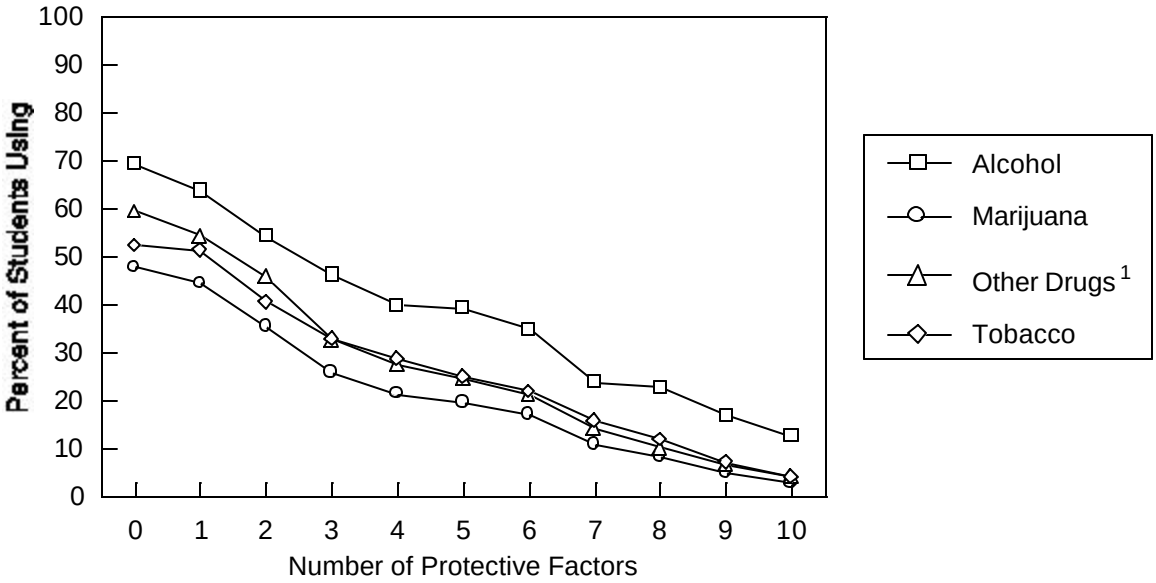
Exhibit 4.9 Relationship Between Past Month Substance Use and the Number of Reported Risk Factors Among the Maine Student Population in Grades 6-12: 1998/1999



[1]Defined as use of marijuana, cocaine, LSD or other psychedelics, or speed or amphetamines.

Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

Exhibit 4.10 Relationship Between Past Month Substance Use and the Number of Reported Protective Factors Among the Maine Student Population in Grades 6-12:



1998/1999

[1]Defined as use of marijuana, cocaine, LSD or other psychedelics, or speed or amphetamines.

Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

month than students who were not at risk on these factors. The peer-individual risk factors that showed the strongest relationships with violent and prohibited behaviors in the past year were "early initiation of antisocial behaviors" and "interaction with antisocial peers."

Protective factors from all domains were shown to be positively related to the health behavior scales. Youths who were resilient on these factors were 2 to 10 times more likely *not* to report substance use or violent or prohibited behaviors than students who were not resilient.

The cumulative effect of risk and protection factors on alcohol and drug use was evident among Maine students. Students at high risk on a larger number of risk factors were increasingly more likely to use alcohol and other drugs while students possessing a larger number of protective factor were increasingly less likely to use alcohol and other drugs.

5. SUMMARY AND IMPLICATIONS

Findings from this study have implications for substance abuse prevention policy, planning, and program development in the State of Maine. This study was designed to assist the Maine Office of Substance Abuse (OSA) in identifying adolescent populations in greatest need of substance abuse prevention and in developing prevention programs and services that target risk and protective factors for substance abuse. Even though some of the risk factors examined in this study (i.e., grade in school, gender, and race/ethnicity) are impossible to alter, they do serve to identify those with elevated risk for substance use. Other risk factors can be modified, such as academic performance, antisocial behaviors, youth perceptions, and availability of alcohol, tobacco, and other drugs. The same is true for protective factors. Highlights of findings and implications regarding programming are provided in the following sections.

5.1 Substance Use and Prohibited Behaviors

The most commonly used substances by Maine students were alcohol, tobacco, and marijuana. Recent use of alcohol was reported by nearly one third of Maine students. Approximately one fifth of all students reported recent cigarette use. Recent marijuana use was reported by over one tenth of all students.

There were few differences in substance use by gender and race/ethnicity.

The rate of substance use increased steadily between grades 6 and 12 for all substances except inhalant use, where the highest rates of recent use were reported among 6th through 9th graders (8% of 8th graders reported inhalant use in the past month).

Students in Maine reported substance use prevalence rates that were similar to those reported in the Nation (Johnston et al., 1999). The one notable exception is that marijuana use was substantially higher among Maine 12 th graders than among 12th graders in the Nation as a whole.

More than 1 in 10 Maine students reported attacking others during the year prior to the survey with the intention of seriously hurting them. About twice as many males as females reported this behavior. Rates for attacking someone were highest in grades 8 and 9.

Almost 9 in 10 students (87%) reported that they neither attacked someone nor carried a handgun in the year prior to the survey. About 7% reported

performing one or the other behavior "1 or 2 times," and the remaining 6% reported displaying these behaviors more frequently.

About 2 in 10 Maine 11th and 12th grade students reported being drunk or high at school in the year prior to the survey.

More than 1 in 10 students in the 10th through 12th grades reported having sold illegal drugs in the year prior to the survey.

5.2 Risk and Protective Factors

One way to reduce students' substance use and violent or prohibited behavior is to identify those factors that make youths more or less likely to participate in such behaviors and then work to reduce the risk factors while increasing protective factors. National research has identified a set of risk and protective factors that have been shown to be related to these prohibited behaviors (Hawkins et al., 1992, 1997). The results of this student survey indicate that these risk and protective factors are related to the same behaviors in Maine as well. Caution must be taken to interpret the data as a correlation, and not necessarily as a cause and effect. For example, we cannot tell from these data whether students are more likely to use substances because they perceive them to be available, whether students perceive substances to be more available because they use them, or whether both their use and their perception of availability might be caused by a third factor, such as laws and norms favorable to substance use.

The following findings suggest some potential targets for prevention efforts:

Older students tend to demonstrate more risk factors and fewer protective factors than younger students.

All risk factors in the community, school, family, and peer-individual domains were shown to be related to both recent substance use (in the past month) and recent violent or prohibited behavior (in the past year). The risk factors most strongly associated with these behaviors were as follows:

perception of the ease of obtaining substances,
perception of laws and norms favorable to substance use,
parental attitudes favorable toward drug use and antisocial behavior,
early initiation of substance use and antisocial behaviors,
friends' substance use and interaction with antisocial peers, and
sensation seeking.

For each of these risk factors, students with that risk factor were at least *six times* more likely to participate in the behaviors than students without that risk factor.

All protective factors in the community, school, family, and peer-individual domains were shown to be related to both recent substance use (in the past month) and recent violent or prohibited behavior (in the past year), meaning that students with any particular protective factor were less likely to participate in the behaviors than those without it. The protective factors most strongly associated were as follows:

social skills and
belief in the moral order.

For each of these factors, students without that protective factor were at least *five times* more likely to participate in the problem behavior than students with that protective factor.

In addition to the relationships between risk and protective factors and substance use, there is a very strong linear relationship when multiple risk or protective factors are present. The more risk factors a student has, the more likely that student is to have used substances or engaged in prohibited behavior in the past month. The more protective factors that are present, the less likely that student is to have used substances or engaged in prohibited behavior in the past month.

5.3 Implications

When considering program development and implementation, Maine needs to move in the following directions for expanding the existing prevention system.

5.3.1 Environmental Strategies

Environmental strategies, which have been used with increasing frequency in the past 10 years, are a powerful tool in our society' s effort to reduce the toll of alcohol, tobacco, and other drug problems. Although they build on and complement traditional prevention efforts, environmental strategies involve a fundamental shift in perspective. In an environmental or systems approach, alcohol, tobacco, and other drug use are seen as community issues and a reflection of the community' s norms or practices. Individual behavior is seen as being influenced by a complex interaction of many factors. These factors include such immediate influences to the individual as family norms and behavior and peer pressure. They also include broader areas, such as school, workplace, neighborhood, religious institutions, and communities. Further influences include such issues as the media, economics, pricing, and availability of substances. Environmental strategies target overarching factors that affect the community as a whole, changing the environment in order to reduce substance abuse.

5.3.2 Bonding and Meaningful Involvement

A second area for expansion of prevention programs in Maine centers on increasing the bonding and involvement of Maine' s youths with their families, schools, communities, or a significant positive role model or mentor. Current research in the prevention field has identified opportunities for bonding and involvement as one of the most salient protective factors in terms of preventing substance use and other problematic behaviors by youths. Increasingly, the importance of multiple bonds is being recognized—youths need these opportunities in all the major arenas in their lives: family, school, and community. Although the importance of the parent-child bond has always been acknowledged and was strongly documented by the National Longitudinal Study of Adolescent Health (Resnick et al., 1997), the prevention field is increasing the attention paid to the importance of the bonds between youths and their peers, their teachers, and other adults in their communities. Youths frequently cite a lack of opportunities for involvement in their communities as one of their primary concerns, and they express a desire for additional opportunities to build meaningful relationships with adults. Programs that increase these opportunities should be solicited in future prevention initiatives.

Systemic change on multiple levels is the most effective way to have an impact on the current and future issue of substance abuse and prohibited behaviors. Adoption of environmental strategies and programs that provide and foster opportunities for bonding and meaningful involvement holds much promise. This programmatic expansion would complement the existing prevention efforts in the State of Maine.

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APPENDIX A

Supplementary Tables

Exhibit A.1 Factor Analysis of Community Risk and Protective Factors Among the Maine Student Population: 1998/1999

Community Factor	No. of Items	Scale Midpoint	% Non-missing Data	Alpha	Mean
Risk Factors					
Low neighborhood attachment	3	2.5	92.9	0.85	1.9
Community disorganization	5	2.5	90.9	0.78	1.6
Personal transitions and mobility	4	2.5	90.0	0.72	1.6
Community transitions and mobility	1	2.5	91.5	NA	1.8
Laws and norms favorable toward drug use	10	2.5	92.4	0.84	2.0
Perceived availability of drugs and handguns	5	2.5	91.6	0.84	2.2
Protective Factors					
Opportunities for conventional involvement	5	2.5	82.9	0.67	3.0
Opportunities for positive interaction	1	2.5	91.6	NA	2.4
Rewards for conventional involvement	3	2.5	91.7	0.80	2.4

NA: Not applicable.

Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

Exhibit A.2 Factor Analysis of School Risk and Protective Factors Among the Maine Student Population: 1998/1999

School Factor	No. of Items	Scale Midpoint	% Non-missing Data	Alpha	Mean
Risk Factors					
Academic failure	2	2.5	91.8	0.69	2.0
Little commitment to school	6	3.0	98.6	0.82	2.5
School absentism	3	3.0	94.5	0.56	1.3
Protective Factors					
Opportunities for positive involvement	5	2.5	95.7	0.61	3.0
Rewards for conventional involvement	4	2.5	94.4	0.67	2.8

Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

Exhibit A.3 Factor Analysis of Family Risk and Protective Factors Among the Maine Student Population: 1998/1999

Family Factor	No. of Items	Scale Midpoint	% Non-missing Data	Alpha	Mean
Risk Factors					
Poor family management	6	2.5	87.2	0.79	1.7
Poor discipline	3	2.5	86.7	0.76	2.0
Conflict	3	2.5	87.7	0.76	2.1
History of antisocial behavior	5	1.5	83.4	0.77	1.3
Parental attitudes favorable toward drug use	3	2.5	89.5	0.80	1.3
Parental attitudes favorable to antisocial behavior	3	2.5	88.7	0.70	1.3
Protective Factors					
Attachment	6	2.5	83.4	0.85	3.1
Opportunities for positive involvement	3	2.5	83.7	0.76	3.0
Rewards for conventional involvement	2	2.5	83.8	0.87	3.1

Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

Exhibit A.4 Factor Analysis of Peer-Individual Risk and Protective Factors Among the Maine School-Aged Population: 1998/1999

Peer-Individual Factor	No. of Items	Scale Midpoint	% Non-missing Data	Alpha	Mean
Risk Factors					
Rebelliousness	3	2.5	98.6	0.74	1.9
Early initiation of substance use	4	4.5	97.6	0.76	1.8
Early initiation of antisocial behaviors	5	4.5	98.0	0.63	0.4
Impulsiveness	4	2.5	94.0	0.78	2.0
Antisocial behavior	8	4.5	97.9	0.81	1.1
Attitudes favorable toward antisocial behavior	5	2.5	98.2	0.87	1.6
Attitudes favorable toward substance use	4	2.5	98.3	0.76	1.6
Perceived risks of substance use	4	2.5	95.2	0.81	1.9
Interaction with antisocial peers	7	3.0	94.6	0.86	1.2
Friends' substance use	4	3.0	96.4	0.77	2.0
Sensation seeking	3	3.5	97.3	0.85	2.5
Rewards for antisocial involvement	4	3.0	95.8	0.85	1.7
Gang involvement	2	1.0	95.8	0.77	0.1
Protective Factors					
Social skills	4	2.5	96.8	0.65	3.0
Belief in the moral order	4	2.5	98.0	0.76	3.1

Source: Maine Youth Drug and Alcohol Use Survey: 1998/1999.

APPENDIX B

Suppression Rule for Prevalence Estimates

Appendix B

Suppression Rule for Prevalence Estimates

This appendix describes the rule used in this report to suppress unreliable prevalence estimates (i.e., rates that cannot be reported with confidence because they are based on small sample sizes or have large sampling errors). In defining a rule for deciding not to publish unreliable estimates, important goals are to be able to identify unreliable estimates easily and to have a rule that can be easily incorporated into software for producing tables.

One rule that has been used in national surveys (e.g., the National Household Survey on Drug Abuse [NHSDA] prior to 1990) is to suppress estimates if they have a relative standard error (RSE) greater than or equal to 50% of the prevalence estimate. The RSE is computed by dividing the standard error (SE) of the estimate by the estimate itself. That is,

> RSE = SE(p)/p, where p is the estimated proportion, and SE(p) denotes the standard error of the proportion p.

Although the 50% RSE rule is easy to implement and understand, it has some undesirable properties, particularly for small estimates. Specifically, the rule imposes a very stringent suppression requirement on small prevalence estimates, but a very lax requirement on large rates. That is, small prevalence rates must have relatively large sample sizes to avoid being suppressed, but large rates require much smaller sample sizes. Given that most drug use and most risk factors are likely to be small, a rule that imposes stringent sample size requirements on small estimates would be less desirable.

Because of the limitation of the 50% RSE rule, a different suppression rule was used for the report on risk and protective factors among Maine's student population. The rule used in this report is based on (a) a sample size requirement, and (b) the RSE of the natural log of the estimate. Specifically, estimates were suppressed and shown as a plus sign (+) in exhibits when

(a) the number of cases in the *denominator* was less than 30; or

(b) if an estimate was based on 30 or more cases in the denominator, it failed to pass the rule below, using the RSE of the natural log of the estimate p, where p is a proportion.

Specifically, estimates that were based on 30 or more cases in the denominator were suppressed if

RSE [$-ln(p)$] > .275 for p <= .5
RSE [$-ln\ (1-p)$] > .275 for p > .5

For computational purposes, note that RSE[$-ln(p)$] = RSE(p)/[$-ln(p)$] = SE(p)/[$-p\ ln(p)$], where SE(p) denotes the standard error of p, the estimated proportion.

Note that the sample size requirement for publishing estimates applied to the number of cases in the *denominator*, not the number of cases in the *numerator*. For example, if fewer than 30 respondents in the entire sample (n = 22,161) reported a particular behavior (e.g., use of cocaine in the month prior to the survey), the estimate could still be considered reliable if it passed the requirement based on the RSE of the natural log of the estimate.

Statisticians at the Research Triangle Institute (RTI) developed the rule based on the RSE of the natural log of the estimate through their work on the NHSDA and the Washington, DC, Metropolitan Area Drug Study (DC*MADS), a comprehensive study of drug use and related issues in that metropolitan area.

The rule based on the RSE of the natural log is more liberal with regard to reporting smaller estimates but is more stringent with regard to larger estimates. Under the rule based on the natural log of the RSE, for example, prevalence estimates of 1% would require a sample size of 61 to be presented. In comparison, a suppression rule based on RSE(p) > .50 would require an effective sample size of 400 respondents to publish percentages of approximately 1%.

As noted above, estimated percentages that failed to pass the suppression criteria listed above were shown as a single plus sign (+) in the exhibits. In situations where a population *count* was shown (i.e., estimated number of students in Maine showing a characteristic of interest), the estimated number was suppressed if the corresponding proportion of the population showing this characteristic did not pass the suppression criteria.

An additional convention was implemented for *very small* percentages (i.e., < 0.05%) that passed the suppression criteria but would round to zero if shown to only one decimal place in the prevalence tables. These estimates were shown as two plus signs (++).

In addition, if an estimated percentage was less than 0.05%, any accompanying estimate of the number of people showing this characteristic was shown with a double plus sign. This was done in order to minimize confusion or misunderstanding that could occur if an estimated percentage was reported as rounding to zero, but an estimated number of people had been shown.

APPENDIX C

Maine Youth Drug and Alcohol Use Survey